NATIONAL REGISTER TESTING OF 19 PREHISTORIC SITES ON FORT HOOD, TEXAS: THE 2000–2001 SEASON

by

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During the 2000ñ2001 field season, Prewitt and Associates, Inc., conducted geoarcheological investigations at 19 prehistoric sites. These sites contain 20 separate subareas that are classified as follows: 11 open campsites, 7 rockshelters, 1 open campsite/burned rock midden, and 1 burned rock mound. The sites were tested and evaluated for National Register eligibility, and 9 of the subareas (3 open campsites, 4 rockshelters, the open campsite with burned rock midden, and the burned rock mound) contain intact buried archeological remains and are recommended as eligible for listing in the National Register of Historic Places. The other 11 subareas contain no intact or significant cultural deposits and are recommended as not eligible. Of the 7 tested rockshelters, only 1 has no evidence of looting, 5 have moderate to severe looting damage, and 1 has been destroyed by looting activities.

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EXECUTIVE SUMMARY

This report was prepared by Prewitt and Associates, Inc., Cultural Resources Services, of Austin, Texas, for the Directorate of Public Works, Environmental Management Office, Fort Hood. It was done under contract with the United States Army Fort Hood to evaluate the archeological research potential and National Register eligibility of 19 sites located on Fort Hood. The objective of the archeological testing was to determine if these sites contained significant archeological remains and were eligible for listing in the National Register of Historic Places. National Register criteria are used as the yardstick to measure the importance (or research potential) of prehistoric archeological sites at Fort Hood as defined in *Significance Standards for Prehistoric Cultural Resources: A Case Study from Fort Hood* by Lain Ellis, Christopher Lintz, W. Nicholas Trierweiler, and Jack M. Jackson (1994).

Archeological testing of 19 prehistoric sites (20 subareas) took place between May 2000 and January 2001. Work at these sites consisted of a surface inspection and geomorphic assessment, mechanical excavation of 114 backhoe trenches, and hand excavation of 71 test units (64 m^3 of fill removed) and 3 shovel tests. Thirteen archeological features, including a large burned rock midden and a burned rock mound, were investigated, and 3,639 artifacts were recovered. The 19 prehistoric sites (with subareas designated by letters) reported herein are assessed as follows:

SITES ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER:

41BL43	Rockshelter (contains human remains)
41BL231-D*	Open campsite
41BL488-A	Rockshelter
41BL491	Rockshelter
41BL589-B	Rockshelter
41BL991-B	Open campsite
41CV580	Open campsite/burned rock midden
41CV686-A	Burned rock mound
41CV1434-B	Open campsite

SITES NOT ELIGIBLE FOR LISTING IN THE NATIONAL REGISTER:

41BL142-A	Rockshelter
41BL231-B*	Rockshelter
41BL490	Rockshelter
41BL989-B	Open campsite
41BL993-B	Open campsite
41BL1039-B	Open campsite
41CV70-B	Open campsite
41CV118-B	Open campsite
41CV506-B	Open campsite
41CV669-B	Open campsite
41CV730-B	Open campsite

*Note that site 41BL231 has one subarea that is eligible and one subarea that is not eligible.

Archeological testing revealed that 9 of the 19 tested sites (9 of 20 subareas) contain intact buried archeological remains that are considered significant. Single cultural components were identified at 7 of the sites, and multiple stratified components were identified at 41BL991-B and 41CV580. All defined cultural components date from the Middle Archaic to Protohistoric periods.

Human bones found in disturbed deposits at 41BL43 indicate that a burial(s) of at least two individuals was probably disturbed or destroyed by looting in this rockshelter. Although it has been looted in the past, intact deposits were found, and the intact human burials may be present.

Under the 1966 National Historic Preservation Act (P.L. 89-655, as amended), the army is responsible for protecting archeological sites determined eligible for listing in the National Register. The army should make every effort to ensure that no further damage occurs at these sites from army training actions or other activities such as illegal looting. If additional disturbances to these sites cannot be avoided, the army should pursue data recovery excavations to mitigate loss of archeological data.

Archeological testing revealed that 11 of the 19 tested sites (11 of 20 subareas) are recommended as not eligible for listing in the National Register. These sites have little or no potential to contain intact cultural deposits that may yield important archeological information. No further archeological work or management consideration is recommended for these sites.

ABSTRACT

During the 2000–2001 field season, Prewitt and Associates, Inc., conducted geoarcheological investigations at 19 prehistoric sites. These sites contain 20 separate subareas that are classified as follows: 11 open campsites, 7 rockshelters, 1 open campsite/burned rock midden, and 1 burned rock mound. The sites were tested and evaluated for National Register eligibility, and 9 of the subareas (3 open campsites, 4 rockshelters, the open campsite with burned rock midden, and the burned rock mound) contain intact buried archeological remains and are recommended as eligible for listing in the National Register of Historic Places. The other 11 subareas contain no intact or significant cultural deposits and are recommended as not eligible. Of the 7 tested rockshelters, only 1 has no evidence of looting, 5 have moderate to severe looting damage, and 1 has been destroyed by looting activities.

The National Register eligible sites include 15 distinct cultural components. The burned rock mound was used during the Toyah phase, but the open campsites contain components of Middle Archaic, Late Archaic, Late Prehistoric (Austin and Toyah phases), and Protohistoric age. One open campsite (41BL991-B) and the open campsite/midden (41CV580) are notable because they have multiple stratified components, and they provide important paleoclimatic evidence in the form of buried paleosols. Continued recognition of the late Holocene paleosols (i.e., the Tanktrail and Leon River paleosols) at the top of West Range alluvium in many stream systems on Fort Hood contributes to the growing regional evidence for a period of widespread landscape stability during the late Holocene. The four eligible rockshelters contain evidence of Late Archaic and Late Prehistoric occupations. One of these rockshelters (41BL488-A) is notable because a marine shell bead found there is only the third such artifact found on Fort Hood. These marine shell artifacts constitute evidence of prehistoric interactions between central Texas hunter-gatherers and coastal groups.

ACKNOWLEDGMENTS

The investigations conducted during the 1999 and 2000 field seasons were under the supervision of Dr. Cheryl Huckerby, director of the Cultural Resource Management Program (CRMP) at Fort Hood. Other CRMP personnel assisting with the completion of this project include Dr. Allan Morton, Karl Kleinbach, Kristen Wenzel, and Gavin Smith. I give them many thanks for their support.

Several other people at Fort Hood directly aided in conducting fieldwork. Larry Pohlman at the Department of Public Works, Maintenance Division, coordinated the schedule for the backhoe, and Lester Duncan provided his expertise in operating the equipment. Gil Eckrich, with the Nature Conservancy of Texas, helped in directing work in areas of endangered species habitat. Training Area Access issued vehicle permits and G3 Range Control, in particular Larry Ximenez, helped with logistics. These people have assisted us for more than 5 years, and their cooperation is greatly appreciated.

Doug Boyd was the principal investigator, and I served as project archeologist, directing the fieldwork and report preparation. During my tenure at Prewitt and Associates, I have been fortunate enough to work with Doug on Fort Hood and other projects. The invaluable field crew consisted of Kyle Killian, who served as the assistant project archeologist, along with Mike Wilder, Mark Holderby, Janée Taylor, and Dennis Glinn. These people have returned for several field seasons at Fort Hood, making my job much easier. Chris Salls joined the crew during the later phase of fieldwork. Along with Mike and Dennis, Chris Ringstaff mapped all the sites, allowing me to avoid one of my least favorite tasks. Chris also conducted the lithic analysis and aided in report writing. Karl Kibler and Amy Holmes were the project geomorphologists. Karen Gardner supervised the laboratory work, maintained the database, conducted curation, and undertook the mussel shell analysis. Ruth Marie assisted in the lab and processed all the flotation samples. Brian Wootan and Sandy Hannum prepared the figures and illustrations, and Jack Rehm photographed the artifacts. Melissa Keenan, and Jane Sevier, and Audra L. Pineda edited and produced the report. Ed Baker reviewed this report for the Texas Historical Commission, and Susan Dial and Brett Houk did peer reviews.

Four consultants conducted special analyses. Dr. Phil Dering (Ethnobotany Laboratory, Texas A&M University) and Brian Shaffer completed the macrobotanical and faunal analyses. Dr. Mary Malainey provided the lipid residue analysis on one artifact, and the osteologist was Dr. Joan E. Baker.

Gemma Mehalchick
Project Archeologist

INTRODUCTION

Gemma Mehalchick

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The Fort Hood military reservation (Figure 1.1), a 339.6-mi^2 (217,337 acres) area of Bell and Coryell Counties, Texas, has been the scene of intensive archeological investigations since the late 1970s. This report documents the 2000–2001 investigations completed as part of Fort Hood's ongoing Cultural Resource Management Program. Geoarcheological investigations were conducted at 19 prehistoric sites.

Following regulations (36 CFR 800) of the National Historic Preservation Act [16 U.S.C. 470(f) and 470h-2(f)] of 1966 (as amended), Fort Hood has been engaged in a program to inventory and evaluate its cultural resources to determine the eligibility of historic properties for listing in the National Register of Historic Places (NRHP). Between 1977 and 1991, archeological surveys covering approximately 95 percent of the post documented more than 2,200 prehistoric and historic archeological sites. In 1990, Fort Hood entered into a programmatic agreement with the United States Army, the Texas State Historic Preservation Officer (SHPO), and the Advisory Council for Historic Preservation. In accordance with this agreement, personnel from Fort Hood's Cultural Resource Management Program developed a 5-year Historic Preservation Plan for fiscal years 1990–1994, followed by a Cultural Resource Management Plan (CRMP) for fiscal years 1995–1999. The Historic Preservation Plan (Jackson 1990) and the CRMP (Jackson 1994a) established long-range goals for managing Fort Hood's cultural resources. With the inventory of cultural resources essentially completed by 1990, except for portions of the Live Fire and Permanent Dudded areas, the Fort Hood CRM Program began evaluating the prehistoric archeological sites. Mariah Associates, Inc., (now TRC Mariah) of Austin, Texas, initiated the testing and began evaluating prehistoric archeological sites in 1991. Their work included preliminary evaluations of 571 prehistoric sites in an intensive resurvey and shovel-testing program, followed by more-intensive mechanical and hand testing of 113 sites.

Prewitt and Associates, Inc., (PAI) was contracted in 1995 to conduct archeological work at Fort Hood and continued to test and evaluate prehistoric archeological sites in accordance with the CRMP. In fiscal years 1995 (Mehalchick et al. 1999), 1996 (Kleinbach et al. 1999), 1997 (Mehalchick, Kleinbach, et al. 2000), 1998 (Arnn et al. 2000), and 1999 (Mehalchick, Killian, Caran, et al. 2000; Mehalchick, Killian, Kibler, et al. 2000), PAI tested a total of 97 prehistoric sites for National Register eligibility. To date, PAI has also conducted reconnaissance survey and shovel testing at 75 prehistoric sites and a small survey (1,729 acres) in the Live Fire Area (Killian and Blake 2001). Fort Hood issued one delivery order in fiscal year 1999 for PAI to conduct National Register testing at 15 prehistoric sites and a second delivery order in fiscal year 2000 to test 4 sites (Table 1.1). This report presents results of the investigations at these 19 sites.

This report is organized into eight chapters and five appendixes. Chapter 2 presents general environmental background data for Fort Hood. Chapter 3 presents archeological background information for the central Texas region and Fort Hood and discusses the research design that guided the site testing. Chapter 4 summarizes the field investigations and describes the field, laboratory, and analytical methods used for National Register-eligibility testing of the 19 sites. Chapter 5 describes the results of the

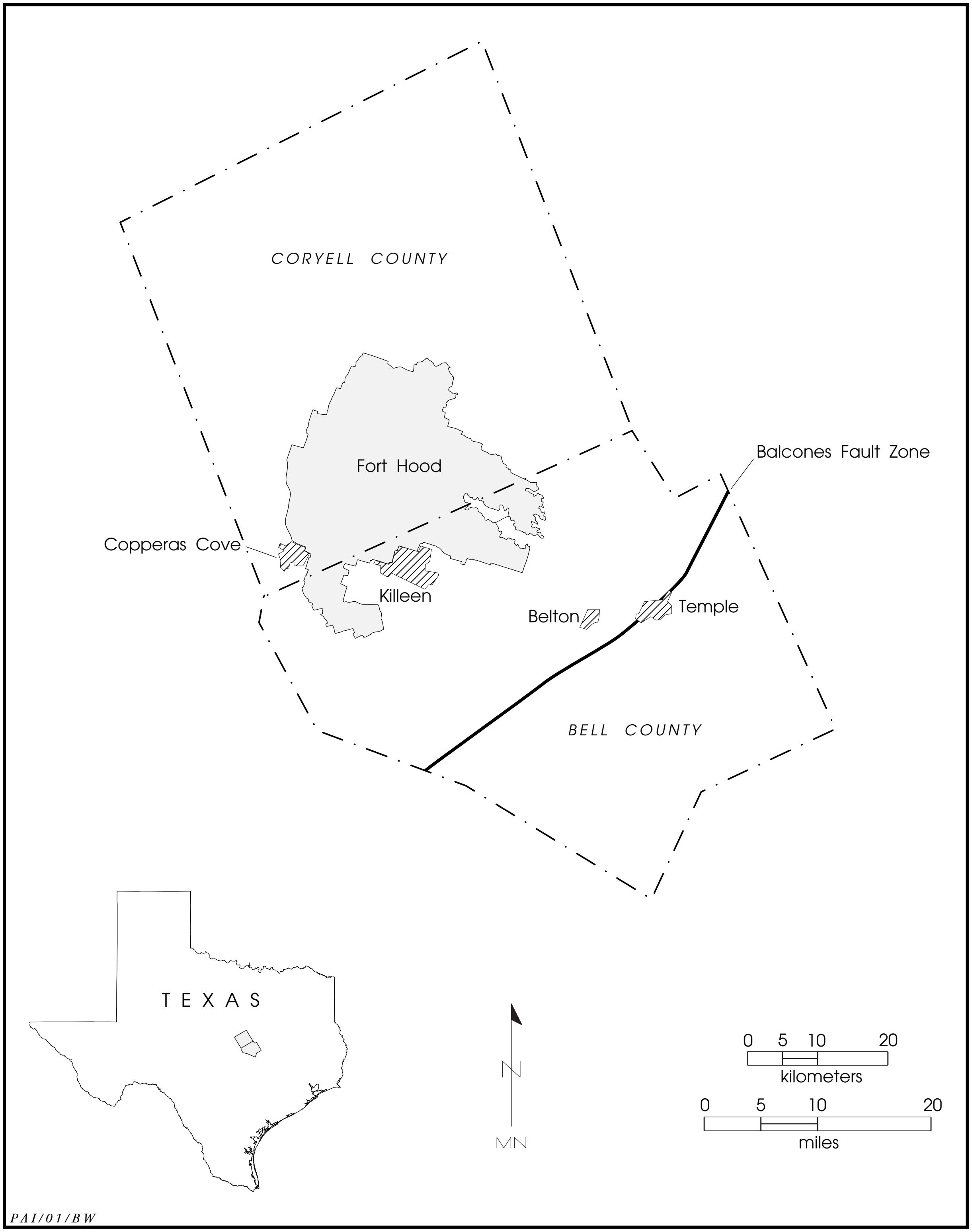

Figure 1.1. Location of Fort Hood.

Table 1.1. Classification of the prehistoric archeological sites tested in 2000–2001*

Open Campsites		Rockshelters		Open Campsite/ Burned Rock Midden	Burned Rock Mound
41BL231-D	41CV118-B	41BL43	41BL490	41CV580	41CV686-A
41BL989-B	41CV506-B	41BL142-A	41BL491		
41BL991-B	41CV669-B	41BL231-B	41BL589-B		
41BL993-B	41CV730-B	41BL488-A			
41BL1039-B	41CV1434-B				
41CV70-B					

* Archeological testing was done on 20 subareas at 19 sites. Site 41BL231 encompasses an open campsite and a rockshelter that were both tested.

National Register site testing. In addition to providing information on site setting and previous archeological work, each site summary also discusses the level of testing, artifacts recovered, features encountered, chronological assessment and geomorphic context of the cultural deposits, and interpretation of the data. When appropriate, horizontally or vertically discrete cultural zones that are reasonably well dated are identified as separate analytical units. Cultural materials recovered from the 19 sites are described in Chapter 6. Chapter 7 interprets the archeological data by comparing and contrasting geomorphic and cultural observations of National Register-eligible sites to groups of previously tested sites located in similar settings (e.g., rockshelters). Chapter 8 summarizes the testing results and presents National Register recommendations for each site. This final chapter also suggests appropriate strategies for more-intensive testing and data recovery at National Register-eligible sites. This chapter concludes with general recommendations for Fort Hood's Cultural Resource Management Program.

The appendixes provide a range of technical data. Appendix A summarizes the 22 radiocarbon dates obtained during testing and provides corrected radiocarbon ages and $\delta^{13}C$ values. Geological descriptions of selected stratigraphic profiles in backhoe trenches and test units are presented in Appendix B. Appendixes C, D, and E present analyses of vertebrate faunal remains (Brian Shaffer, North Texas State University), invertebrate faunal remains (Karen Gardner, Prewitt and Associates), and macrobotanical remains (Phil Dering, Texas A&M University).

ENVIRONMENTAL BACKGROUND

Karl W. Kibler and Gemma Mehalchick

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Fort Hood is located in the Lampasas Cut Plain, a subprovince of the Grand Prairie (Hayward et al. 1996) and is bisected by the northeastern edge of the Edwards Plateau (Hill 1901). The area represents a transitional zone from the more humid east to the semiarid west, and the environmental gradient is steep enough that distinct changes in landscape and vegetation are observable from east to west across the base. Geologically, Fort Hood is situated west of the Balcones Fault Zone on lower Cretaceous carbonate rocks. A distinct escarpment does not exist along the fault zone in the Fort Hood area. Distinct differences do exist, however, between the soils and vegetation developed on the upper Cretaceous (Gulfian Series) rocks east of the fault zone and those developed on the lower Cretaceous (Comanchean Series) rocks to the west (Abbott 1995a:5).

CLIMATE

The modern climate of the Fort Hood area is subtropical, characterized by hot, humid summers and relatively short, dry winters (Natural Fibers Information Center 1987:6). The prevailing wind blows from the south, reaching peak strength during the spring. Summer temperatures are high, with an overall average of 83ºF (28.3ºC) and an average daily maximum of 96ºF (35.5ºC) in Coryell County. The average temperature in winter is 49ºF (9.4ºC), but it tends to vary considerably because of the periodic passage of cold fronts, resulting in a pattern of alternating cold and mild days (McCaleb 1985:3).

Annual precipitation is approximately 32.5 inches (82.6 cm) for Coryell County (Natural Fibers Information Center 1987:121). Although rainfall occurs year round, the overall distribution pattern is bimodal, with peak rainfall occurring in the late spring and early fall.

FLORA AND FAUNA

The flora and fauna of Fort Hood are typical of the Balconian and Texan biotic provinces (Blair 1950). The biotic assemblage represents a mix of species from the Blackland Prairie to the east and the Edwards Plateau to the west. Many specific ecological niches also exist across the base, depending on the local topography, slope aspect, soil, and geology. The eastern side of the facility is characterized by dense juniper and oak forest and scrub, but upland areas to the west and south are generally more open. Grasslands are most common on the intermediate upland surfaces, but juniper and oak scrub typically covers the high upland surface. Riparian zones are common along drainages and show a variety of hardwood species.

The Balconian faunal assemblage includes 57 species of mammals, but none are solely restricted to the Balconian province (Blair 1950:113). Eight of these species also inhabit the Texan province to the east and the interconnecting riparian zones (Blair 1950:101). Other native faunas include 36 species of snakes, 15 species of frogs and toads, and 16 species of lizards. Several prehistorically significant economic species once common to the area, such as bison and pronghorn antelope, were killed off in historic times.

GEOLOGY, GEOMORPHOLOGY, AND LATE QUATERNARY STRATIGRAPHY

The Fort Hood landscape consists of the dissected northeastern margin of the uplifted Edwards Plateau and reflects the variable resistances of underlying geologic formations to erosion. Structurally, a deeply buried extension of the Paleozoic-age Ouachita Mountains, which divide the stable continental interior to the west from the subsiding Gulf basin to the southeast, underlies the area. During the Cretaceous period, this region consisted of a very broad shelf covered by a shallow sea. Limestones and marls were deposited on the shelf as the shoreline fluctuated for more than 80 million years. Occasionally, relatively thin deposits of sand derived from terrestrial sources also accumulated on the shelf, building interbedded formations like the Paluxy Formation and Trinity Sands. The Gulf basin subsided during the Miocene, developing the Balcones Fault Zone along the old Ouachita line and uplifting the Edwards Plateau (Woodruff and Abbott 1986). West of the Balcones Fault, the Cretaceous limestones and marls remain relatively horizontal and structurally unmodified, but the Cretaceous rocks to the east dip sharply Gulfward and are deeply buried by Gulfian and later lithological units.

Because Fort Hood is west of the fault zone, relatively flat-lying lower Cretaceous rocks exhibiting a two-tiered topography locally termed the Lampasas Cut Plain (Hayward et al. 1990) underlie it. This landscape developed between the Brazos and Colorado Rivers and consists of large, mesa-like remnants of an early Tertiary planation surface surrounded by a broad, rolling pediplain formed during the late Tertiary and early Quaternary. These two surfaces differ by 25–40 m in elevation and form the "high" and "intermediate" uplands of Hayward et al. (1990) and the "Manning" and "Killeen" surfaces of Nordt (1992). Modern stream valleys are incised approximately 40–70 m into the pediplain surface.

The oldest exposed rocks at Fort Hood belong to the Trinity Group, which includes the Glen Rose Formation. This formation is surficially exposed on the western side of Fort Hood, where relatively deep incision of the landscape by Cowhouse Creek and its tributaries has removed the overlying rocks (Proctor et al. 1970; Sellards et al. 1932).

Resting on the Trinity Group are rocks of the lower Cretaceous Fredericksburg Group. The lowest unit is the Paluxy Formation, a terrigenous siliclastic unit of strandplain, fluvial, and deltaic deposits. The Walnut Clay, which is widely exposed at Fort Hood and forms the principal substrate of the Killeen surface, overlies the Paluxy Formation. Above the Walnut Clay lies the Comanche Peak Limestone, which forms the intermediate slopes of the higher Manning surface. The highest extensive lithological unit is the Edwards Group, including the Edwards Limestone that forms the resistant cap of the high upland mesas or Manning surface. Edwards Group formations also are an important source of high-quality chert (see Frederick and Ringstaff 1994; Frederick et al. 1994).

Nordt (1992, 1993, 1995), who identifies six principal alluvial units in the study area, has examined the stratigraphy and soil geomorphology of a number of larger Fort Hood streams in detail. From oldest to youngest, these units are termed the Reserve alluvium, Jackson alluvium, Georgetown alluvium, Fort Hood alluvium, West Range alluvium, and Ford alluvium (Nordt 1992). The Reserve alluvium is a fill of middle- to late-Pleistocene age that forms the T_3 terrace of the Leon River. The Jackson alluvium is approximately 15,000 years old and consists of 3–4 m of gravelly and loamy deposits resting on a bedrock strath. It forms the T_2 terraces of the Leon River and Cowhouse Creek and its larger tributaries. The Georgetown alluvium is the oldest unit within the deeply entrenched Holocene valley of Cowhouse Creek and its larger tributaries. It is always buried below the T_1 terrace surface. Deposition of this unit began no earlier than 11,300 B.P. and terminated by 8200 B.P. (Nordt 1992). The 4–6-m-thick fill consists of gravelly and loamy deposits. The Royalty paleosol, formed on top of the Georgetown alluvium, typically consists of a truncated Bk horizon containing secondary precipitates of calcium carbonate. The Fort Hood alluvium is the major Holocene unit by volume along Cowhouse Creek and most of its tributaries. It consists of 9–10 m of gravelly and loamy deposits that date between about 8000 and 4800 B.P. The West Range alluvium accumulated in two episodes between 4300 and 600 B.P., with a brief erosional period between 3000 and

2000 B.P. The West Range unit is typically 9 m thick; it partially truncates and buries the Fort Hood alluvium in some areas. The Fort Hood and West Range alluviums aggraded to the same elevation in many of the valleys, making the T_1 surface diachronic. Deposition of the Ford alluvium and construction of the modern floodplain (T_0) began 400–600 years ago and are continuing.

In addition to the alluvial deposits within the stream valleys, colluvial and slopewash sediments also comprise culturally relevant deposits within the base. These deposits occur both as relatively thick wedges of sediment at the base of steep slopes and as thin mantles on moderate to gentle slopes and level uplands. They commonly interdigitate with a number of alluvial fills at valley margins. Pedogenically altered late Pleistocene- and Holocene-age colluvial and slopewash sediments derived from the Paluxy Formation are particularly significant deposits, encapsulating prehistoric cultural materials and features along the upper margins of many Pleistocene-age valleys at Fort Hood. Also archeologically significant are rockshelters and their accompanying sedimentary fills. Rockshelters and small overhangs are very common on Fort Hood, and the nature of their fills varies from shelter to shelter (Abbott 1995b:835).

ARCHEOLOGICAL BACKGROUND AND RESEARCH CONTEXTS

Karl W. Kibler and Gemma Mehalchick

3

CULTURAL CHRONOLOGY AND PALEOENVIRONMENTAL RECONSTRUCTION

The prehistoric cultural sequence for central Texas can be divided into three broad periods—Paleoindian, Archaic, and Late Prehistoric—although the terms Neoarchaic (Prewitt 1981, 1985) and Post-Archaic (Johnson and Goode 1994) have been used at times in place of Late Prehistoric. Black (1989:25–32), Collins (1995), and Hines (1993) provide thorough overviews of these periods, with Hines focusing more on the chronological sequence of the prehistoric cultural resources in the area surrounding Camp Bullis. Prewitt (1981, 1985) has delineated and defined a prehistoric cultural-historical framework incorporating discrete temporal and technological units. Johnson and Goode (1994) and Collins (1995) have presented revised cultural chronologies of the region and have discontinued use of the term "phase" to describe each cultural-historical unit; they have opted for named intervals or patterns based on diagnostic projectile point styles and associated radiocarbon assays (e.g., Martindale-Uvalde interval) within each period or subperiod. These three cultural chronologies are compared in Figure 3.1. Figure 3.2 compares the paleoenvironmental reconstructions Johnson and Goode (1994) and Collins (1995) offer with paleoenvironmental models from Nordt et al. (1994) and Toomey et al. (1993) for the central Texas region.

Although the chronologies of Prewitt (1981, 1985), Johnson and Goode (1994), and Collins (1995) all have merit, this report uses Collins's because it appears to be the most precise in terms of its radiocarbon-dated projectile point sequence. An exception is that the Austin and Toyah phase names are retained as designations for the two subperiods of the Late Prehistoric period. These phase designations, which correspond precisely with Collins's (1995) Scallorn-Edwards- and Perdiz-style intervals are used in this report because they are very well defined and widely accepted by most researchers. The cultural chronology and paleoenvironmental evidence for central Texas are discussed in many other reports and are not summarized here.

PREVIOUS ARCHEOLOGICAL RESEARCH AT FORT HOOD

The history of archeological investigations at Fort Hood has been discussed many times and is not revisited here. The reader is referred to Jackson (1994b), Trierweiler (1994a, 1994b), and Trierweiler et al. (1995) for brief summaries of archeological investigations conducted in and near Fort Hood. Black (1989), Black et al. (1997), Collins (1995), and Ellis et al. (1994) provide the best background information for understanding the broader history of archeological method and theory in central Texas archeology. Previous investigations of prehistoric sites in the Fort Hood area are summarized in Table 3.1.

PREHISTORIC RESEARCH AND NATIONAL REGISTER SIGNIFICANCE CRITERIA

Significance testing for the National Register of Historic Places (NRHP), established by the National Historic Preservation Act of 1966, was not rigorous during early archeological

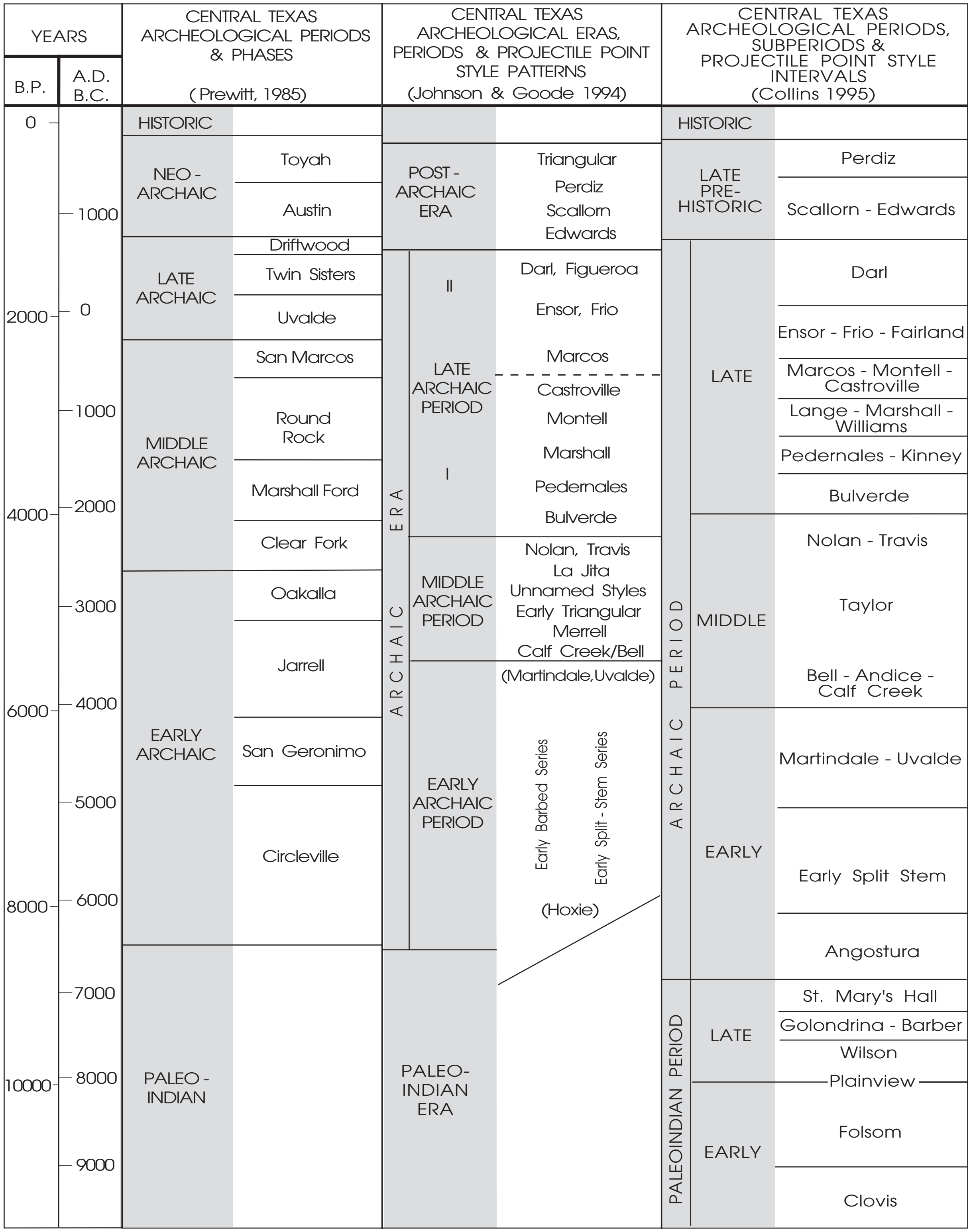

Figure 3.1. Prehistoric cultural sequences of Prewitt (1985:Figure 5), Johnson and Goode (1994:Figure 2), and Collins (1995:Table 2).

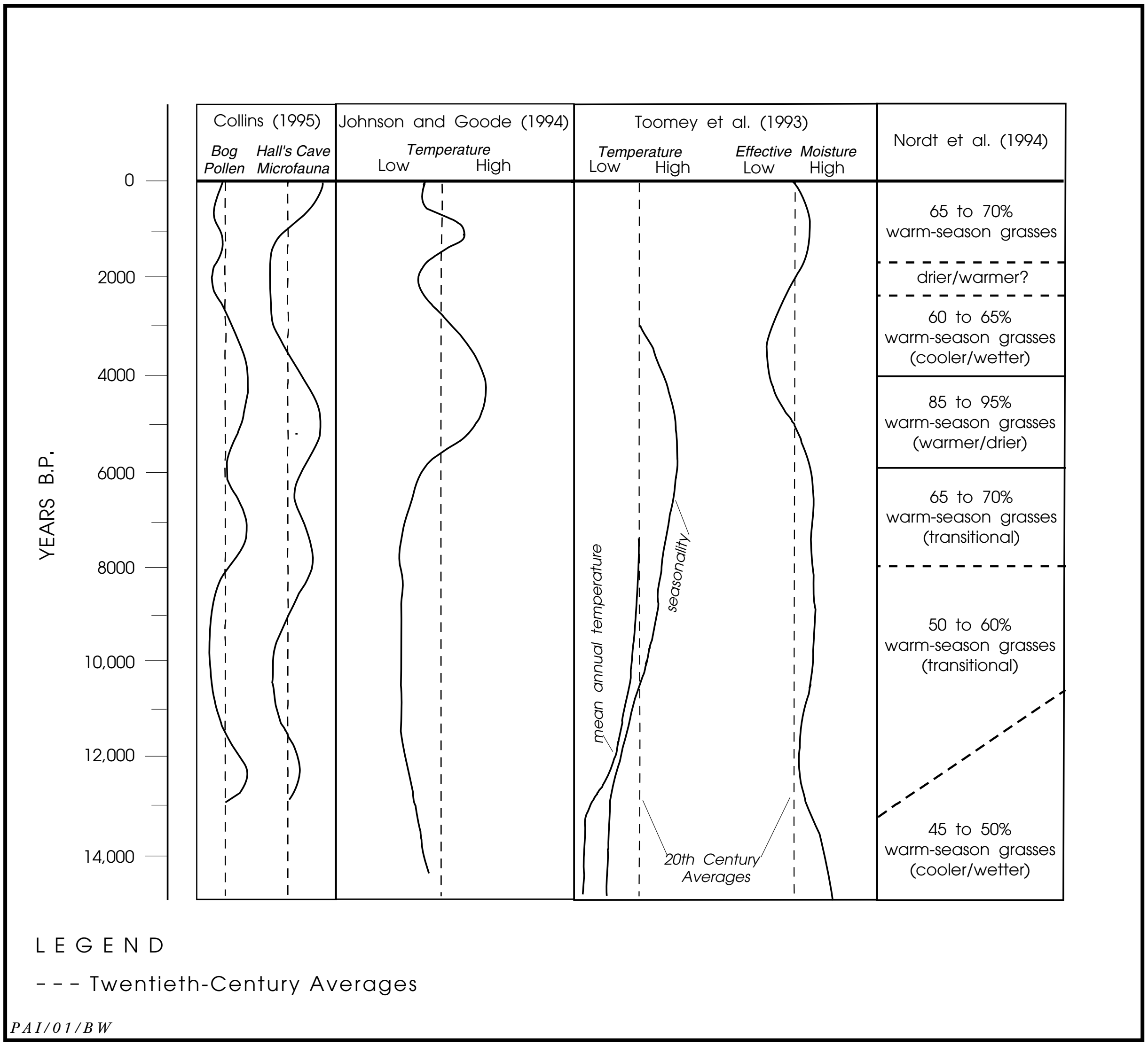

Figure 3.2. Late Pleistocene and Holocene paleoenvironmental records of Collins (1995:Table 2), Johnson and Goode (1994:Figure 2), Toomey et al. (1993:Figure 9), and Nordt et al. (1994:Figure 4).

investigations at Fort Hood. Through trial and error over the last 30 years, evaluating sites for National Register eligibility has become increasingly more formal, with a variety of research orientations, paradigms, and anthropological theories used at different times for measuring potential. In the early 1990s, Mariah Associates conducted an intensive study aimed at developing a prehistoric research design for Fort Hood. In the resulting document, Ellis et al. (1994) determined that the simplistic cultural-historical perspective that prevailed throughout the history of archeological research in central Texas was not providing satisfactory results. They created a new framework for evaluating National Register eligibility of Fort Hood prehistoric sites that is both rigorous from a theoretical perspective and practical in terms of its implementation. This research design defines the ultimate goals of prehistoric archeological research at Fort Hood and establishes a set of NRHP significance standards for judging the research potential of individual prehistoric sites.

Table 3.1. Summary of previous prehistoric archeological research in and near Fort Hood

Year	Description of Research	Report	ARMS Number*
Early 1930s	Prehistoric site excavations in Bell County by A. T. Jackson (University of Texas at Austin)	unreported, see Young 1988	none
1933	Excavation of the Willison Farm rockshelter, 41BL3, by A. T. Jackson (University of Texas at Austin)	Jackson 1933; Wilson and Steele 1996	none
1930s	Ranney Creek Cave site excavation, Coryell County	unreported, see Prewitt 1974	none
1930s	Prehistoric site investigations by Frank H. Watt, including excavation of Aycock Rockshelter (or Kell Branch Shelter #1) in Bell County	Aynesworth 1936; Watt 1936; see also Lawrence and Redder 1985 and Stephenson 1985	none
1940s	Belton Reservoir preliminary survey by Robert Stephenson	see Shafer et al. 1964	none
1950s and 1960s	Belton Reservoir survey and excavations	Miller and Jelks 1952; Shafer et al. 1964	none
1960s	Stillhouse Hollow Reservoir survey and excavations	Johnson 1962; Sorrow et al. 1967	none
1960–1962	Youngsport site excavations, Bell County	Shafer 1963	none
1970s	Hog Creek Reservoir investigations by Southern Methodist University	Larson et al. 1975; Larson and Kirby 1976	none
1977	Hog Creek Reservoir investigations by the University of Tulsa	Henry et al. 1980	none
1960s and 1970s	Early surveys of Fort Hood by the Fort Hood Archeological Society	Thomas 1978	none
Late 1970s	Initial CRM surveys of Fort Hood by Science Applications	Skinner et al. 1981; Skinner et al. 1984	1, 2
1980s	CRM surveys of Fort Hood by the Texas Archeological Survey, The University of Texas at Austin	Dibble and Briuer 1989; Dibble et al. 1989; Roemer et al. 1989	3, 4, 10
1981	Historic research and remote sensing studies at Fort Hood, Fort Hood CRM program	Jackson and Briuer 1989	5, 6, 7
1980s – early 1990s	CRM surveys at Fort Hood by Texas A&M University	Carlson et al. 1986: Carlson et al. 1987; Carlson et al. 1988; Carlson et al. 1994; Ensor 1991; Koch et al. 1988; Koch and Mueller-Wille 1989a, 1989b; Mueller-Wille and Carlson 1990a, 1990b; Thoms 1993	11, 14, 15, 16, 17, 18, 20, 21, 23, 24, 27
1981–1983	Analysis of military training impacts to archeological sites in West Fort Hood by Texas A&M University	Carlson and Briuer 1986	9

Table 3.1, continued

Year	Description of Research	Report	ARMS Number*
1985	Preliminary analysis of human skeletal remains from five vandalized rockshelters on Kell Branch, Bell County	Franciscus et al. 1985	None
1986	Developed standard operating procedures for field survey	Briuer and Thomas 1986	13
1991	Archeological site testing and evaluation (prehistoric and historic), Henson Mountain area, by Texas A&M University	Carlson 1993c	26
1990–1992	Site testing at Fort Hood, by Texas A&M University Field Schools	Carlson 1993a, 1993b, 1997	19, 22, 29
1989–1992	Geoarcheological studies of Fort Hood by Texas A&M University	Nordt 1992, 1993	25, 28
1993	Development of NRHP significance standards for prehistoric sites on Fort Hood by Mariah Associates	Ellis et al. 1994	30
1991–1993	Intensive shovel testing of 571 prehistoric sites by Mariah Associates	Trierweiler, ed. 1994	31
1993–1994	Edwards chert patination study by Mariah Associates	Frederick et al. 1994	32
1993–1994	NRHP prehistoric site testing by TRC Mariah Associates	Abbott and Trierweiler 1995a	34
1994	Archeological investigation of Native American medicine wheel by Mariah Associates	Quigg et al. 1996	33
1994–1995	NRHP prehistoric site testing by TRC Mariah Associates	Trierweiler 1996	35
1995	CRM survey of 164 acres adjacent to Fort Hood; land later acquired by Fort Hood	Largent 1995	none
1995	NRHP prehistoric site testing by Prewitt and Associates	Mehalchick et al. 1999	37
1996	NRHP prehistoric site testing by Prewitt and Associates	Kleinbach et al. 1999	38
1997	NRHP prehistoric site testing by Prewitt and Associates	Mehalchick, Kleinbach et al. 2000	39
1998	NRHP testing and reassessment of 41CV1423 by Prewitt and Associates	Arnn III et al. 2000	40
1999	NRHP testing and reassessment of the Clear Creek Golf Course site, 41CV413, by Prewitt and Associates	Mehalchick, Killian, et al. 2002	46
1999	Archeological survey of 1,729 acres in the Clabber Creek and Jack Mountain ranges of the Live Fire Area, by Prewitt and Associates	Killian and Blake 2001	45
1999	Geoarcheological investigations and NRHP prehistoric site testing by Prewitt and Associates	Mehalchick, Killian, Caran, et al. 2000	44
1999	Limited data recovery at the Clear Creek Golf Course site, 41CV413, by TRC Mariah	Not yet reported	?

Table 3.1, continued

Year	Description of Research	Report	ARMS Number*
2000–2001	NRHP prehistoric site testing by Prewitt and Associates	Mehalchick, Ringstaff et al. 2001	47
2000	Testing and reassessment of Paluxy sites and limited data recovery at the Firebreak site (41CV595)	Mehalchick, Kibler, et al. 2002	48

Note: Some of the early investigations relate to an area approximately 100 km in diameter centered around Fort Hood, but most relate specifically to archeological investigations on the military reservation.

* ARMS = Fort Hood Archeological Resource Management Series. ARMS Research Report No. 8 was never published, and ARMS Research Reports 12, 36, 41, 43, and 49 relate only to historic sites.

The Fort Hood research design defines four fundamental research domains that "address the basic issues which underlie archeological analysis" (Ellis et al. 1994:100). It also identifies testable hypotheses that are categorized within a set of seven substantive research domains. These domains, ordered from simplest to most complex, provide meaningful questions that may be addressed using basic archeological knowledge and data sets established by the fundamental research domains. The ultimate goal is to begin modeling adaptive behavior based on the premise (or null hypothesis) that the prehistoric inhabitants of Fort Hood employed a foraging strategy. The fundamental and substantive research domains for Fort Hood archeological research are summarized in Table 3.2.

Within the substantive research domains, Ellis et al. (1994) propose a series of 19 testable hypotheses and the types of archeological data needed to address them. They are not practical for evaluating sites based on small amounts of archeological data obtained from limited testing. To bridge this gap, Ellis et al. (1994) boil down the research domains into their "Significance Model for Fort Hood." The model is a series of questions that define the types and quality of archeological data that a significant site must possess:

1. Does the site (or subarea) have the potential to contain intact and undisturbed assemblages of artifacts and features?

2. Does the site (or subarea) have the potential to contain chronological indicators?

3. Does the site (or subarea) have the potential for stratigraphically separated (i.e., buried) deposits in primary context?

4. Does the surface assemblage have evidence of primary lithic procurement and lithic reduction activities (pertains to sites with surficial evidence only)?

5. Do currently available technical procedures allow temporal separation of unstratified palimpsest assemblages (pertains to sites with surficial evidence only)?

6. Does the site meet any or all of the crucial data needs to test cultural hypotheses? Presence or absence of such data is determined by the following questions:

   - Does the site contain prehistoric bone or shell specimens that can be identified and dated?
   - Does the site contain prehistoric macrobotanical specimens that can be identified and dated?
   - Does the site contain features that may contain economic and chronometric samples or that may imply economic activities?
   - Does the site contain multiple and spatially separated features?
   - Does the site contain burned-rock features, including middens or mounds?

Table 3.2. Summary of fundamental and substantive research domains for prehistoric archeological research at Fort Hood

Fundamental Research Domains	Chronological markers: • temporally diagnostic artifacts • geomorphic dating Paleoenvironmental research: • paleoclimate • paleotopography • paleoecology • paleoenvironmental synthesis	Subsistence bases: • flora • fauna Technological apparatus: • tool production • tool use • consumables in the technological system
Substantive Research Domains	1. Site function I: identifying the apparatus of subsistence and nonsubsistence technologies 2. Site function II: spatial organization of individual technologies 3. Stability and change in technology and subsistence 4. Identifying adaptations I: temporally specific arrays of technologies and subsistence resource bases 5. Identifying adaptations II: adaptive strategies 6. Fort Hood in regional context 7. Explaining adaptation and adaptive change	

- Does the site contain unique, unusual, and nonlocal artifact types, artifact materials, concentrations of artifacts, feature types, or constellations of these?

The archeological research must address each of these questions, in order, for each site investigated. Questions 1, 2, and 3 assess contextual integrity; question 6 assesses content integrity. Questions 4 and 5 pertain to sites with surficial (or very shallowly buried) cultural evidence only and need not be considered for sites with buried cultural deposits. For a site with buried deposits, the answers to questions 1, 2, 3, and 6 must all be yes to meet the requirements for National Register eligibility; if the answer to any is no, the site is considered to have a fatal flaw and is considered ineligible.

The model of site significance proposed by Ellis et al. (1994) identifies sites that contain discrete, stratified layers of cultural occupation (or *gisements* as described by Collins [1995:374]). Archeologists must look for sites with sufficient context (i.e., containing stratigraphically discrete evidence of cultural occupation or use) and content (i.e., intact features, assemblages of associated artifacts, and datable and interpretable organic remains) to allow for testing hypotheses relating to cultural behavior. These types of archeological sites are worthy of eligibility for listing in the National Register because they are likely to yield archeological data useful for addressing the prehistoric research problems identified for Fort Hood (Ellis et al. 1994:103–171). Such sites are considered eligible under Criterion D because they "have yielded, or are likely to yield, information important in prehistory or history" (National Park Service 1995:2).

WORK ACCOMPLISHED AND METHODS OF INVESTIGATION

Gemma Mehalchick

4

This chapter summarizes the work accomplished and methods employed at 19 sites selected for National Register eligibility testing. The archeological research PAI conducted is consistent with the Fort Hood CRMP as defined by Jackson (1994a) and with previous prehistoric site investigations TRC Mariah Associates (Mariah) conducted. PAI adopted many of the same field and analytical methods developed by Mariah in compliance with Fort Hood directives. Methods and procedures in four main areas were wholly adopted or only slightly modified.

First, PAI continued to use the research contexts and specific assessment criteria Ellis et al. (1994) developed for evaluating National Register significance (see Chapter 3). Second, in terms of field implementation of the research design, PAI continued to employ the concept of "red flag" data sets. The limited site testing in 1999 was designed to determine whether sites contained certain types of data that would make them eligible for listing in the National Register. Testing was terminated at each site once evidence was sufficient to identify the presence of red flag data sets. This limited level of testing does not generate large samples of material culture and features, nor does it adequately address the problem of establishing site boundaries for extensive open sites. Although this level of investigation is less intensive than typically employed for National Register testing in Texas, it follows Fort Hood's CRMP philosophy of minimizing the costs of evaluating large numbers of sites.

Lithic analysis and the identification of material sources was the third area in which the current investigations strove for long-term consistency. Previous researchers had recognized relationships between the geographic distribution of many distinctive varieties of Edwards cherts and their occurrence in prehistoric sites. Mariah developed a chert typology based on extensive field investigations and laboratory research using lithic samples collected from chert outcrops during the archeological survey of the base and during Mariah's resurvey of lithic resource procurement sites (Frederick and Ringstaff 1994:125–181). Fort Hood is the largest chert-rich area in central Texas where lithic sources have been examined thoroughly, so Mariah's work provides a substantial foundation for beginning to address research questions relating to prehistoric use of lithic materials. PAI continues to use the established chert typology as a baseline from which to begin its lithic material investigations.

Quality control for archeological field and laboratory investigations is the fourth area in which continuity with previous research was maintained. PAI's quality control program follows the same basic procedures Mariah used, with some minor modifications. The quality control program resulted in a rigorous review of the consistency of archeological methods and data.

Each of these four topics is discussed in more detail in this chapter. In addition, this chapter summarizes site investigations and the wide range of archeological methods and procedures PAI used during its Fort Hood prehistoric site testing program.

NATIONAL REGISTER SIGNIFICANCE CRITERIA: RED FLAG DATA SETS

National Register eligibility was evaluated according to the Fort Hood research design and the red flag site concept Ellis et al. (1994) developed. Red flag sites are identified as "sites which have a high probability of requiring further management attention" (Trierweiler 1994a:11). To employ National Register significance criteria in the field, Mariah modified the red flag concept to include four red flag data sets. The presence of any one of these data sets establishes a site as having a high research potential and as being eligible for listing in the National Register. Abbott and Trierweiler (1995a:37) define the four red flag data sets as:

1. macroscopically visible organic remains (charcoal, bone, seeds, shell) in a primary, thin bedded, and stratigraphically discrete context;

2. multiple and stratigraphically discrete cultural occupations with high chronometric potential, as evidenced by abundant charcoal or hearths with fired substrates or in situ burned rocks;

3. human bone found in undisturbed stratigraphic contexts; and,

4. buried Paleoindian or Early Archaic components in primary and nondisturbed contexts.

Red flag data sets 1 and 2 pertain directly to the issues of site content and context, as defined in the model of site significance for Fort Hood by Ellis et al. (1994) and summarized in Chapter 3. Data set 3 recognizes the research potential of human remains in an intact archeological context. As originally used by Mariah, data set 4 was employed because the research design identified the Paleoindian and Early Archaic periods as underrepresented.

Because the system of red flag data sets was employed, the overall level of testing at each prehistoric site was limited. The criteria of one or more of the three primary red flag data sets (excluding human remains) were often satisfied by only a few test units. This was particularly true for open sites in alluvial settings where, even on initial inspection of backhoe trenches, it was obvious that test units would produce evidence of organic remains and cultural materials in primary contexts associated with one or more stratigraphically discrete cultural zones.

Each site was reviewed before test excavations were conducted, taking into account recommendations of the original investigators when possible. Because overall testing was limited by the specifications of the delivery order for National Register testing, various levels of testing at individual sites were determined by distributing overall work (i.e., the number of trenches and total volume of hand-excavated units) according to the testing goals for each site. Fort Hood approved recommended levels of effort, with a great deal of flexibility to reallocate work based on actual field findings. Investigations were conducted at the 19 sites (20 subareas) between May of 2000 and January of 2001, and excavations consisted of 114 backhoe trenches, 71 test units, and 3 shovel tests (Table 4.1). Twenty-six analysis units were defined, and 22 radiocarbon dates were obtained.

As used in this report, analysis units equate to definable cultural components, and one or more may be identified at any given site. An analysis unit was defined when an artifact assemblage or a group of features and artifacts was spatially discrete (horizontal or vertical separation) and sufficient chronological evidence (diagnostic artifacts, soil stratigraphy, radiocarbon dates, or any combination of these) allowed for a reasonable temporal assessment of the remains. Analysis units may represent very short occupations or broader periods of time. For all sites where the contextual and chronological data were too limited to identify meaningful components, all archeological remains are grouped as a single analysis unit.

FIELD METHODS

Field methods described in this section were employed during formal National Register testing at 19 sites. The methods used at three sites (41BL989-B, 41BL991-B, and 41BL993-B) varied slightly from those used at the other 16 and will be discussed in detail below. Formal testing at 16 sites consisted of a site reconnaissance, backhoe trenching, and manually excavated test units. With the site records and

Table 4.1. Summary of work accomplished

Site	Site Type	Drainage	Geomorphic Setting	No. of Backhoe Trenches	No. of Test Units	No. of 10-cm Levels	Volume of Test Units Excavated (m^3)	No. of Shovel Tests	No. of Analysis Units
ELIGIBLE									
41BL43	Rockshelter	Cowhouse Creek	Upland Manning surface rim	n/a	2	16	1.05	–	1
41BL231-D	Open campsite	Bull Branch tributary	T_1 terrace	–	2	24	2.40	–	1
41BL488-A	Rockshelter	Bull Branch tributary	Upland Manning surface rim	n/a	3	16	1.20	1	1
41BL491	Rockshelter	Bull Branch tributary	Upland Manning surface rim	n/a	1	5	0.45	–	1
41BL589-B	Rockshelter	Bull Branch tributary	Upland Manning surface rim	n/a	1	4	0.35	–	1
41BL991-B	Open campsite	South Nolan Creek and tributary	T_1 terrace	24	10	111.25	12.68	–	3
41CV580	Open campsite/ burned rock midden	Leon River	Toeslope and T_0 terrace	3	3	53	5.53	–	5
41CV686-A	Burned rock mound	Owl Creek tributary	Upland Killeen surface	–	1	6	0.60	–	1
41CV1434-B	Open campsite	Table Rock Creek	T_1 terrace	4	4	24	2.75	–	1
Subtotals				31	27	259.25	27.01	1	15
NOT ELIGIBLE									
41BL142-A	Rockshelter	Owl Creek tributary	Upland Manning surface rim	n/a	2	19	1.25	–	1
41BL231-B	Rockshelter	Bull Branch tributary	Upland Manning surface rim	n/a	1	5	0.47	1	1
41BL490	Rockshelter	Bull Branch tributary	Upland Manning surface rim	n/a	2	12	1.10	1	1
41BL989-B	Open campsite	South Nolan Creek	T_1 terrace	3	2	19	1.90	–	1
41BL993-B	Open campsite	South Nolan Creek tributary	T_1 terrace	34	11	89.5	8.33	–	1
41BL1039-B	Open campsite	Clear Creek	T_0, T_1, and T_2 terraces	25	11	92	9.33	–	1
41CV70-B	Open campsite	Owl Creek tributary	T_1 terrace	4	1	21	1.05	–	1
41CV118-B	Open campsite	Owl Creek tributary	T_0 and T_1 terraces	11	2	46	2.30	–	1
41CV506-B	Open campsite	Owl Creek tributary	T_1 terrace	–	8	81	8.25	–	1
41CV669-B	Open campsite	Owl Creek tributary	T_0 and T_1 terraces	4	2	25	1.25	–	1
41CV730-B	Open campsite	Owl Creek tributary	Toeslope and T_1 terrace	2	2	36	1.80	–	1
Subtotals				83	44	445.5	0.00	2	11
Totals				114	71	704.75	64.04	3	26

maps made by previous investigators in hand, the project archeologist conducted a reconnaissance to reevaluate each site. The goals were to become familiar with the site layout; re-locate surface or subsurface features, artifact concentrations, and previous shovel tests or test pits; assess the geomorphic interpretations and subarea designations previous researchers made based on landforms; and evaluate the condition of the site to determine if further disturbances had occurred since the last investigation.

Because no formal geoarcheological reconnaissance had been previously conducted at 41BL989-B, 41BL991-B, and 41BL993-B, this phase of work was undertaken before excavation. A two-person team, an archeologist and a geomorphologist, visited and visually inspected the surface and subsurface exposures on each site and compared current conditions with those recorded previously. Sites were divided into subareas when there were two or more distinct geomorphic surfaces with differing archeological potentials present (e.g., a terrace and upland surface). Descriptive and quantitative archeological and geomorphic forms were completed for each site or subarea, and when applicable, an existing site map was modified. One of two recommendations was then made for each site or subarea. The area was either recommended as not eligible for National Register listing because the investigation demonstrated that intact cultural remains were not possible, or formal testing was recommended based on the potential for isolable archeological deposits. For sites recommended as not eligible, no further management was required.

To avoid damaging endangered species habitats or other protected areas, mechanical excavations could not be undertaken before a representative from the Texas Nature Conservancy at Fort Hood inspected the site. Site locations were checked on military installation maps and corresponding aerial photo sheets, and site sketch maps showing specific areas to be trenched were reviewed. Permission to proceed with unrestricted trenching was granted on all open campsites except 41CV506-B and 41CV669-B. No trenches were excavated at 41CV506-B because the site is situated in a protected habitat (endangered species and plant studies). The area also was inaccessible for a backhoe because of the dense vegetation and the steep topography of the stream valley. Trenching at 41CV669-B was limited to previously cleared areas because the site is located in endangered species habitat.

Additional pre-excavation procedures were required at sites 41BL989-B, 41BL991-B, 41BL993-B, and 41BL1039-B. Because they were situated either in the cantonment area (i.e., developed, nonmilitary training areas) or near Camp Finlayson (a Girl Scout camp), a digging permit had to be obtained from the Environmental Division. Representatives of all appropriate Fort Hood departments, including land management and archeology, reviewed and signed this permit. A required procedure in obtaining the permit was to coordinate on site with proper personnel, both army-based (Fort Hood Engineering Plans and Services-Utilities) and nonmilitary (Dig-Tess and the City of Killeen Water Company), to locate and mark all underground utility lines.

Trenching on open sites provided sediment exposures for interpretations of depositional events, allowed for prospecting for buried cultural deposits, and provided access to deeply buried components. The Directorate of Environment and Housing, Maintenance Division, Pavement Section at Fort Hood provided a backhoe and an extremely proficient operator. The project archeologist always accompanied the backhoe operator to monitor trenching. Trench placement was based on the results of shovel testing, past and present observations (such as cultural materials noted in exposures), and the need for adequate horizontal coverage of the site area. Although mechanical and manual excavations were typically conducted within previously delineated site boundaries, in some cases these boundaries were restricted to a small portion of a landform extending hundreds of meters in one or more directions. At times, these circumstances necessitated excavating trenches beyond a previously defined site perimeter, and in some cases site boundaries were modified based on new subsurface finds. But in no case was mechanical testing done specifically to establish site limits; this was beyond the scope of the current investigations.

The project archeologist determined all backhoe trench locations and dimensions, at times consulting the geomorphologist and the project manager. Trenches were numbered consecutively, and a wooden datum stake was placed next to the corresponding trench. The project archeologist noted trench locations on the site sketch map and recorded standardized information about each trench on a backhoe trench data form. Trench orientation was recorded as the direction of the long axis relative to magnetic north. Trench dimensions were recorded in meters. The geomorphologist profiled selected trench walls and described strata on a geologic profile form; in cases in which stratigraphic profiles were similar, only one or two profiles were recorded. Specific information about methods used to describe geologic profiles is found in Appendix B. All trench excavations were monitored, and field personnel inspected trench profiles for cultural remains. As a general rule, trench fill was not screened, but diagnostic artifacts were collected from trench walls and backdirt. When appropriate, in situ samples such as charcoal and bulk sediment samples, were collected. Each sample was given a unique number consisting of the first letter of the sample type followed by a number (e.g., the first charcoal sample collected from a site was designated C1, the first flotation sample was designated F1, etc.). All similar types of samples were numbered consecutively and recorded on a sample inventory form.

Test units were excavated to sample buried cultural deposits, to afford exposures for stratigraphic interpretation, and to provide areal coverage of subsurface deposits across the site. The project archeologist determined locations of test units, at times consulting with the geomorphologist and the project manager. These decisions were contingent on the trenching results, the previous investigators' observations, a general re-inspection of the site area, and the results of shovel testing. When test units were excavated beside a backhoe trench, the unit's orientation corresponded to that of the trench. Isolated units generally were oriented to magnetic north, but nonstandard alignments were conducive at times (e.g., units along the edges of cutbanks or looter's holes or adjacent to the back wall of a rockshelter. Test units usually measured 1x1 m. Deviations from the standard size consisted of 1.0x0.5-m units adjacent to backhoe trenches to sample sediments where no cultural materials were observed or suspected and oversized units (1.5x1.0 m to 1.6x1.0 m) to remove entire or larger portions of features visible in backhoe trenches.

As with the backhoe trenches, test units were numbered sequentially beginning with number one. All units were excavated in arbitrary 10-cm levels, with the ground surface at the highest corner of each unit used as the datum for elevation control. When test units were excavated on the safety benches of backhoe trenches or when overburden was intentionally removed, excavation levels were still numbered from the surface down. Hand excavation of a unit on a safety bench inside a trench, for example, might begin with Level 10 from 90 to 100 cm below the surface.

Hand-excavated fill was dry screened through 1/4-inch-mesh hardware cloth. If they were present, samples of charcoal and a maximum of 15 land snail shells were collected from each general level context. All cultural materials were collected except for unmodified mussel shell fragments lacking hinges (presence noted), burned rocks (sorted by size, counted, and weighed), and intrusive historic and modern items (presence noted). One exception occurred at 41BL1039, where a test unit contained a subsurface historic dump, and a representative sample of artifacts was collected. When the upper levels of a test unit were determined to be sediments of recent origin, clearly redeposited, or severely disturbed, these upper levels were removed as overburden without being screened. Subsurface deposits that obviously represented high-energy, gravelly channel fills also were removed and not screened.

An excavation record form was completed for each level of each test unit, and an artifact frequency distribution summary form and inventory of field bags were filled out for every test unit. Selected profiles of test units, particularly those revealing features or cultural lenses in cross section, were drawn. If necessary for stratigraphic interpretation, geologic profiles of isolated test units were described by the geomorphologist.

Features were typically excavated and removed as discrete provenience units, but nonfeature matrix surrounding features was removed according to arbitrary levels and screened separately. Exceptions include burned-rock midden and mound deposits along with occupation zones, which were excavated in arbitrary 10-cm levels. A feature data form was completed for each feature, and plan and profile views were drawn. Whenever possible, separate charcoal samples were taken from the feature fill. All sediment from discrete features was collected for flotation, whereas larger and thicker features, such as mounds and middens, were sampled. In some cases, flotation samples were recovered from nonfeature contexts, particularly matrix around a feature. Forty flotation samples ranging in volume from 0.24 to 19.20 liters were collected; the average was ca. 3 liters. If portions of a feature were sampled, the remaining matrix was screened through ¼-inch-mesh hardware cloth. The project archeologist noted test unit locations on the site sketch map and recorded excavation progress on daily journal forms. When necessary, a general data form was used for recording additional excavation information or daily notes.

Whenever possible, test units were excavated to bedrock, abundant gravels, deposits that were not culturally relevant in age, or combinations thereof. Where Holocene deposits were greater than 2–3 m, test excavations were terminated at an arbitrary depth at or below the maximum depth of cultural materials observed in trenches or other exposures.

Each site and its excavations were photographed and videotaped. Black-and-white print and color-slide photographs were taken to document all phases of the investigations, including site and area overviews, backhoe trench and test unit profiles, cultural features, and other unusual archeological remains. Video recording of the work in progress and the completed site excavations provided additional documentation.

All open sites and the burned-rock mound were mapped using a Sokkia electronic total station, but mapping concentrated on subareas that were tested. Subareas not tested were partially mapped or completely excluded. A permanent site datum marked by a rebar (without any site tag or cap) in the ground was established at each site and assigned an arbitrary elevation of 100 m. Topographic data for each site relate to these datum points. Every site map includes the natural topography, cultural features visible on the surface, all mechanical and manual excavations, natural and manmade landmarks, and a site or subarea boundary based on the known or suspected spatial limits of surface or buried deposits. If warranted, the geomorphologist drew cross sections of open sites depicting various geomorphic surfaces and associated depositional units. A plan and profile of the rockshelters were mapped with tape, compass, and line level.

During the course of the test excavations, field supervisors reviewed records and maps for consistency and quality. The project manager and the quality control officer reviewed records periodically.

The final field task consisted of backfilling all test excavations. The backhoe filled in each backhoe trench and all accessible test units on open sites. Test units on open sites that could not be reached by the backhoe and excavations placed in rockshelters were backfilled manually by the archeologists.

Once fieldwork was completed, the project archeologist and geomorphologist wrote preliminary site reports for each of the 19 tested sites. These reports were reviewed by the project manager and then submitted, along with corresponding attachments and videotape, to the Fort Hood Cultural Resource Management Office.

LABORATORY METHODS

Before fieldwork began, a thorough review was made of the methods and standards the Fort Hood Cultural Resource Management Program required for laboratory processing and curation of collections. Artifact and material collections also were processed and curated according to federal curation guidelines, Council of Texas Archeologists standards, and current curation and conservation standards.

All collections were organized, processed, and curated by site. Collections from different sites were not intermingled at any stage of processing. As artifacts and samples were brought in from the field, they were organized by provenience and checked against the inventory of field bags and the sample inventory form completed in the field for any problems or inconsistencies with the provenience information. If a problem was noted, it was corrected by referring to other excavation records or by consulting with the project archeologist. Collection bags were also checked for special information or instructions, and these materials were handled accordingly.

Once the field bags were checked, the materials were taken to the wet lab for cleaning. Some artifact categories such as bone, charcoal, and vegetal matter were finger- or dry-brushed rather than being cleaned with water. Other artifacts were cleaned using tap water and, occasionally, a soft toothbrush. After cleaning, artifacts were placed on a drying rack and allowed to thoroughly air dry before being cataloged.

For some stone artifacts, it was necessary to remove calcareous deposits that would hinder analysis. This was done using a 5 percent solution of hydrochloric acid (HCl) in water. Each artifact was soaked for 10 minutes in clear tap water and then soaked in the HCl solution until most of the effervescence ceased. The artifact was then soaked in a series of successive clean tap water baths to remove any remaining acid from the lithic surface. A list of artifacts that received this treatment is included in the project records.

After cleaning, the artifacts were bagged by material type within provenience designation. Each group of provenienced artifacts was assigned a unique provenience-specific accession number. A specimen inventory, organized by site and in accession number order, was compiled with each artifact type listed under its assigned accession number. Recorded on the specimen inventory were the accession number, associated provenience data, the name of the excavator(s), the date of excavation, any other information recorded on the field bag, and the type and quantity of artifacts recovered. For some material categories, such as charcoal, weight (usually in grams) was recorded rather than count.

All categories of artifacts were cataloged with site and accession numbers. Lithic tools were assigned unique specimen numbers within each accession number. When assigned, this number was added after the accession number on the artifact. A portion of each artifact received a base coat of Acryloid B-72 (a 10 percent solution of Acryloid B-72 in acetone). When the base coat was dry, the site, accession, and specimen numbers were recorded using a rapidograph pen with archival black or white ink. This catalog number was then covered with a top coat of Acryloid B-72.

Each artifact type was placed into an appropriately sized 4-mil polyethylene bag. Archival curation tags documenting the name of the project, project number and date, site number, provenience data, accession number, artifact type, and the number of specimens (or weight) were placed into 1.5-mil polyethylene bags and placed within each artifact bag. Artifacts were grouped by artifact types or subtypes if appropriate. For example, projectile points were bagged by type name rather than as one unit.

Flotation samples were processed using the Flote-Tech flotation system, which provides a bimodal method of separating materials in a sediment sample. The process resulted in a light fraction that was used for special analyses (such as macrobotanical) and a heavy fraction that was checked for artifacts larger than $^1/_4$ inch. Roots and unmodified rocks were removed and discarded. Any artifacts found in flotation samples were processed following the procedures outlined above.

Photographic materials were also organized by site. Black-and-white photographs and negatives were checked against the photo logs to ensure that frame numbers and captions correlated and that the recorded information was accurate. The contact sheets were labeled on the back with project, site, and photo numbers. A 3x5-inch print was made from each negative; these also were labeled with project, site, and photo numbers, as well as a caption. Color slides were checked against the photo log to ensure that the frame numbers and captions correlated and that the recorded information was accurate. Each slide was labeled with project name and number, site number, slide number, and caption. All of the photographic materials were placed into the appropriate archival holders. Videotapes of site investigations were labeled with project name and number, site number, and appropriate provenience information.

All forms and records used in the field, the lab, and during analysis were printed on archival paper and filled out in pencil. The exception was maps drawn on nonarchival grid paper, which were later treated in the lab with a deacidification solution. All field, lab, and analysis records were organized by project and then by site. Records were grouped by categories such as daily journal notes, testing forms, feature forms, and specimen inventories. The only exception is that all photographs were curated as a unit, with all of the black-and-white photographs together and all of the color slides together. All written and photographic materials were placed in archival folders, archival record boxes, and archival curation boxes. An inventory detailing contents is included with each curation box. Curated photographic records also contain a computer-generated copy of the photo log, a cross-referenced photo log organized by site, and a disk copy of the computerized photo logs.

ANALYTICAL METHODS

Analyses of material culture (see Chapter 6) varied considerably depending on the class of artifacts being analyzed, the number of specimens within each artifact class, and the specific goals of the analysis. The material culture classification employed during this analysis is outlined in Table 4.2. Artifacts were grouped first by type of material; within each material group, artifacts were further classified into morphological and functional classes and subclasses. Systematic observations of selected attributes were defined for different classes of artifacts. Within each class, each specimen was analyzed individually, and its specific attribute data were recorded on a computer coding form and entered into the computer database. Artifact data were then manipulated using Microsoft ACCESS for Office 97. The detailed attributes recorded for stone artifacts, the most abundant artifact type recovered, are summarized in Table 4.3. All lithic artifact types and terminology are consistent with those Turner and Hester (1993) presented. For smaller artifact classes, such as modified bones or shells, specimens are described individually but detailed attributes were not recorded in the database.

The remainder of this section defines the various artifact classes and subclasses, the attributes recorded for stone artifacts, and the methods of manipulating the material culture data. Attributes recorded for all nonlithic artifacts are described in the appropriate sections of the material culture chapter (see Chapter 6).

Definitions of Artifact Classes

The artifact classification and attribute analysis systems are the same as those PAI used for the 1996, 1997, and 1999 prehistoric site testing (Kleinbach et al. 1999; Mehalchick, Killian et al. 2000; Mehalchick, Kleinbach et al. 2000). They also generally correspond with the artifact analyses previously conducted by TRC Mariah (Abbott and Trierweiler 1995a:56–68; Trierweiler 1996:54–63) and with general morphological descriptions of chipped and ground stone artifacts by Turner and Hester (1993). In this analysis, no attempt was made to infer tool function based on

Table 4.2. Classification of material culture

CHIPPED STONES
- Arrow points
  - named types
  - untyped
  - untypeable fragments
  - preforms
- Dart points
  - named types
  - untyped
  - untypeable fragments
  - preforms
- Unidentified projectile points
- Perforators
- Gouges
  - unifacial
  - bifacial
- Bifaces
  - early/middle stage
  - late stage/finished
  - miscellaneous bifaces
  - knives
  - beveled knives
- Unifaces
  - end scrapers
  - side scrapers
  - end-side scrapers
  - other scrapers
  - miscellaneous unifaces
  - spokeshaves
- Cobble tools-choppers
- Gravers
- Burins
- Core tools
- Multifunctional tools
- Edge-modified flakes
- Cores
- Tested cobbles
- Unmodified debitage

GROUND AND BATTERED STONES
- Manos
- Metates
- Mano-Hammerstones
- Hammerstones
- Other ground stones
- Indeterminate fragments

OTHER STONE ARTIFACTS

CERAMICS*

MODIFIED BONES

MODIFIED SHELLS

BURNED ROCKS

UNMODIFIED FAUNAL REMAINS
- Bones
- Shells

MACROBOTANICAL REMAINS

* No burins or ceramics were recovered during the 2000–2001 season.

Table 4.3. Summary of attributes recorded for stone artifacts

Attributes	Arrow and Dart Points	Unmodified Debitage	Chipped Stone Tools	Ground Stone Tools
Site number, accession (lot) number, and provenience data*	X	X	X	X
Type name	X			
Tool class or subclass	X		X	X
Raw material	X	X	X	X
Chert type	X	X	X	
Completeness	X	X	X	X
Cortex**		X	X	
Patination**	X	X	X	
Heated**	X	X	X	X
Size (by groups)		X		
Maximum length (mm)	X		X	X
Maximum width (mm)			X	X
Maximum thickness (mm)	X		X	X
Blade length (mm)	X			
Blade width (mm)	X			
Haft length (mm)	X			
Neck width (mm)	X			
Base width (mm)	X			
Comments***	X	X	X	X

* Provenience data recorded include backhoe trench or test unit number, excavation level, elevation or centimeters below surface (for piece-plotted specimens), feature association, flotation sample number, surface collection, etc.
** Presence and absence or degree of this trait were noted.
*** Comments field was used for additional observations.

detailed analyses of flaking technology and use wear. A simple morphological and functional classification was employed.

Chipped Stone Artifacts

Arrow and dart points are functional groupings that denote stone artifacts probably used to tip projectiles. They are generally characterized as bifacially (sometimes unifacially) flaked specimens with triangular to leaf-shaped blade sections, sharply pointed distal ends, and sharp lateral edges. The distinction between arrow and dart points is one of size, with arrow points generally having a narrower body and neck (or stem) width (the latter generally less than 8 mm for arrow points). When possible, arrow and dart points were further classified by named types defined in archeological literature. Chris Ringstaff assigned all projectile points to types. Specimens that could not be assigned to a named type are classified as untyped, complete or nearly complete points that do not conform to any specific type, while untypeable fragments are points that are too incomplete to be typed. Preforms consist of unfinished arrow and dart points and include specimens at various stages of reduction.

Perforators are characterized as having relatively long and tapered projecting bits with diamond-shaped biconvex or planoconvex transverse cross sections. They generally exhibit use-related microflaking on both faces of each edge or on alternate faces of opposite edges; polish and rounding are often evident on the lateral edges as well. Perforators may be made from flakes, unifaces, or bifaces, or they may be projectile points reworked into perforators. As a functional group, perforators are thought to have been used primarily for drilling or poking holes through various materials. No distinction was made in analysis between fine-tipped perforators, commonly called drills, and broad-tipped specimens, often called reamers.

Gouges are triangular or trapezoidal specimens with planoconvex transverse and longitudinal cross sections. They may be unifacially or bifacially flaked but have straight to concave, steeply beveled working edges; use polish and microflaking are concentrated primarily on the tool's ventral face. Use wear studies indicate that some gouges were probably hafted tools that functioned much like modern-day planes or adzes. As used in this analysis, gouges also include specimens that conform to the Clear Fork varieties (unifacial and bifacial) of gouges as defined by Turner and Hester (1993:246–249) and tools that some lithic analysts classify as wedges.

Bifaces include all varieties of bifacially flaked tools that are not included in other classes. Bifaces are grouped into three subclasses as defined by Mariah (Abbott and Trierweiler 1995a:60–61; Trierweiler 1996:56–57): early- to middle-stage bifaces, late-stage and finished bifaces, and miscellaneous bifaces. The first two subclasses represent different stages of the biface reduction sequence Callahan (1979), Collins (1975), Sharrock (1966), and others recognized. Early- to middle-stage bifaces approximate Callahan's Stages 2 and 3, Collins's initial trimming into primary trimming, and Sharrock's Stages 1 and 2. They have moderate to large amounts of cortex remaining, and the edges are irregular and exhibit no clear central plane when viewed on end. Some specimens that have thick ridges or lumps where many inadequate flake removals terminated in step fractures represent manufacturing failures. Late-stage to finished bifaces approximate Callahan's Stages 4 and 5, Collins's primary trimming into secondary trimming, and Sharrock's Stages 3 and 4. They are characterized by few or no remnants of cortex, sinuous to straight edges centered on a longitudinal plane when viewed on end, and a well-defined outline shape. Finished bifaces generally have a clear ovate to triangular outline shape. Some late-stage and finished bifaces conform to specific types of tools, such as the Friday, Guadalupe, or San Gabriel bifaces Turner and Hester (1993:254, 256–258, 273) described. The miscellaneous biface subclass is a catchall group that includes bifacially worked specimens too fragmentary or too irregular to be classified as early- to middle-stage or late-stage, finished bifaces. Miscellaneous bifaces include specimens that may have functioned as scrapers or knives, or in other capacities.

Knives are identified by their morphology and imply function (e.g., sawing and cutting). Beveled knives are thin bifaces that were ovate when manufactured, but one or both ends are pointed because alternate blade edges were resharpened. Bifacial knives are finished bifaces that exhibit use or haft wear; these specimens include corner-tang knives.

Unifacial specimens are classified into six subclasses as follows: end scrapers, side scrapers, end-side scrapers, other scrapers, spokeshaves, and miscellaneous unifaces. These subclasses are distinguished by the morphology and location of unifacial retouch and use wear. End scrapers have significant retouch and use wear along their distal edges, side scrapers have one or more worked and worn lateral edges, and combination end-side scrapers have characteristics of both. All these types generally have working edge angles of greater than 40°. These scrapers, particularly end scrapers, may exhibit evidence of hafting in the form of scarring or polishing on ventral ridges or proximal lateral edges. Other scrapers are unifacially worked implements with two or more retouched working edges that do not conform to the standard morphology of the end, side, or end-side scraper subclasses (e.g., a round scraper with its entire circumference serving as a working edge). Miscellaneous uniface is the catchall group for any unifacial tool that does not fit into another subclass and include specimens that are irregularly shaped or have minimal unifacial working and retouch.

Spokeshaves are small flake tools with a worked concave edge that may have functioned as a plane to shave wood off of round sticks or shafts. The notchlike indentation may have been produced bifacially or unifacially. Spokeshave notches produced on other bifacial or unifacial tools (e.g., on an end scraper) are classified as multifunctional tools.

Cobble tools-choppers are unifacially or bifacially flaked implements made on cobbles or pebbles. Cobble tools exhibit extensive step fracturing, edge rounding, and polish indicating heavy wear. Large cobble tools are often called choppers and were probably used as hammers for heavy battering and crushing.

Gravers and burins are flake tools with one or more carefully chipped beaklike protrusions. They probably represent specialized tools used for fine cutting and engraving. Unifacial and bifacial tools with graver tips are classified as multifunctional tools. Burins probably functioned much like gravers (i.e., for cutting and engraving) but were made by striking off a flake along a lateral edge of a flake or tool. This different technique leaves a very steep or right-angled edge where the flake was removed.

Core tools are cores (see below) that have had one or more edges modified to function as a tool or exhibit later use wear. These tools are likely cores that were picked up and used as scraping or battering tools. The primary distinction between core tools and cobble tools is that the former originally functioned as cores before being made into or used as tool, but the latter did not.

As the name implies, multifunctional tools are artifacts manufactured to perform two or more functionally distinct tasks. Multifunctional tools may include artifacts that fall into two or more of the other artifact classes. For example, an end-side scraper with a spokeshave notch or graver beak would be classified as a multifunctional tool rather than as a spokeshave or graver.

Edge-modified flakes are flakes with one or more edges that exhibit very minimal retouch and use wear. These expedient tools were used with little or no preparation. Edge-modified flakes include tools that some lithic analysts call utilized flakes or retouch flakes.

A core is a chipped stone that has had flakes removed, but its primary function was as a source of flakes. Cores exhibit no evidence of use for any function other than flake removal. Tested cobbles are a specific type of core characterized by minimal flake removals, and they retain at least 90 percent of the cortex. These pieces were presumably tested pieces to inspect the quality of the raw material.

Unmodified debitage consists of waste flakes from tool manufacture that exhibit no evidence of having been further modified or used. For analytical purposes, unmodified flakes were classified as complete, proximal fragments, chips (medial or distal fragments), and chunks (angular fragments). Although the amount of cortex present on flakes was recorded (see below), no attempt was made to define flakes according to their inferred reduction stage (such as biface thinning flakes, notching flakes, or unifacial manufacture-resharpening flakes). Before attributes were coded, unmodified flakes also were sorted into the following size categories corresponding to standard sized sieves:

Standard	Metric
<0.25 inch	<64 mm
0.25–0.5 inch	64–130 mm
0.5–1.0 inch	130–254 mm
1.0–1.5 inch	254–381 mm
1.5–2.0 inch	381–508 mm
>2.0 inch	>508 mm

Ground and Battered Stone Artifacts

Ground and battered stone tools are classified into the following groups: manos, metates, mano-hammerstones, hammerstones, other ground stones, and indeterminate fragments. Manos are stones used for grinding and generally have one or two ground faces (i.e., unifacial or bifacial grinding). Metates are milling slabs on which manos were used; they encompass a range of different forms and sizes. Mano-hammerstones functioned primarily as manos but also show evidence of battering along one or more edges. Hammerstones exhibit extensive battering on one or more edges; most hammerstones are water-worn cobbles that often have heavy battering on their ends. The precise function of hammerstones is not always clear, but most specimens are thought to represent percussion hammers used in knapping other stone tools. Other ground stones can include a variety of tools such as anvils, abraders, pestles, nutting-pitted stones, and modified hematite. Indeterminate fragments are pieces of ground stone too fragmentary to identify their form or function. Morphologically distinctive ground stone tools are discussed individually in the artifact descriptions (see Chapter 6).

Modified Bone and Shell Artifacts

Modified bones are specimens intentionally cut, ground, or otherwise altered in manufacturing a tool or ornament. This category may also include specimens exhibiting use wear. Modified shells are shell artifacts intentionally cut, ground, or otherwise altered in manufacturing a tool or ornament. Modified shells may include freshwater mussel valves and marine shells.

Bones or shells that were modified accidentally or incidentally by humans (e.g., broken, cut, or burned while processing food) are classified as unmodified (see Unmodified Faunal Remains below).

Burned Rocks

The burned rock category includes all nonchert rocks (primarily limestone) exhibiting evidence of heating such as thermal discoloration, angular fractures, or spalling. All thermally altered rocks were examined and quantified in the field (i.e., sorted by size and weighed) and then discarded if no other modifications were observed. Size categories used for sorting and quantifying burned rocks are: <5 cm, 1–15 cm, 15–25 cm, 25–35 cm, and >35 cm. Other general field observations made for burned rocks were number of complete nodules vs. fragments and unusual color of breakage characteristics.

The distributions of burned rocks within sites are discussed under each site module (see Chapter 5), but the data were not entered into the artifact database. Many burned rocks are directly associated with heating-cooking features, and even nonfeature burned rocks are considered to have been heated intentionally and were probably used as heat-retaining stones in a heating-cooking feature at one time.

Unmodified Faunal Remains

Faunal remains include vertebrate and invertebrate remains and are classified as unmodified or modified. Depending on their archeological context and other factors, unmodified bones are considered to represent either discarded remains of animals that were killed by humans or remains that were deposited in sites as a result of natural processes. Unmodified bones are specimens that exhibit no evidence of intentional modification. These may include bones modified incidentally or accidentally (e.g., bones that exhibit spiral fractures or cut marks resulting from butchering) by humans. A detailed analysis of all unmodified bones is presented in Appendix C.

Invertebrate faunal remains include land snail shells, freshwater mussel shells, and marine shells. Snail shells, primarily various species of *Rabdotus*, are ubiquitous in cultural deposits at Fort Hood but are believed to occur naturally in most contexts; organic-rich detritus in habitation sites likely attracted the snails. Consequently, the presence and abundance of snail shells was always noted in excavation records, but only a small sample was collected from any given provenience for possible radiocarbon dating and amino acid racemization studies.

Mussel shell valves and fragments also were abundant in several cultural deposits and are believed to represent materials introduced and discarded by humans. All unmodified mussel shell valves with an umbo (whole or partial hinge) were collected; other unmodified fragments were discarded in the field. Discolored and calcined shells indicate that shells were heated intentionally, perhaps to remove the mussels, or burned accidentally, possibly being discarded into fires. A detailed analysis of all unmodified mussel shells is presented in Appendix D.

Macrobotanical Remains

Samples of macrobotanical remains, primarily charred wood and sediments (i.e., flotation samples), were taken from cultural sediments. The presence, absence, or abundance of macrobotanical remains is discussed for individual sites (see Chapter 5) but was not entered in the artifact database. Appendix E analyzes macrobotanical remains from selected sites.

Human Remains

When human bones were tentatively identified by the faunal analyst, they were examined by an osteologist to confirm the identification. Once the presence of human bones was confirmed, the Cultural Resource Management Program director at Fort Hood was immediately notified. No further analysis was done on human remains.

Definitions of Stone Artifact Attributes

Aside from provenience data and classification attributes, other attributes recorded for stone artifacts consist of subjective observations and objective measurements of metric data (see

Table 4.3). Subjective attributes include identifications of raw materials and chert types and assessments of artifact completeness, presence or absence of cortex and patination, and evidence of heating. Objective (i.e., metric) attributes consist of measurements (in millimeters) used to characterize individual specimens. When appropriate, comments regarding nonstandard attributes or observations for individual specimens were added to the database.

Raw Materials and Chert Types

Raw material types identified among the chipped, battered, and ground stone artifacts are chert, quartzite, limestone, sandstone, and hematite. Specimens identified as chert consist of opaque to partially translucent cryptocrystalline or microcrystalline materials. Fine-grained cherts lack visible crystalline structure, have weak to moderate luster, and are partially translucent; coarse-grained cherts have visible crystalline structure, an opaque appearance, and a generally grainy fill. Quartzites are metamorphic rocks consisting mainly of recrystallized quartz. Most recovered quartzite specimens are characterized by fine-grained crystalline structures and a reddish purple color. Various types of Cretaceous limestones (carbonate-rich, fine-grained sedimentary rocks) are found in cultural deposits at Fort Hood (see Burned Rocks). No attempt was made in the field or laboratory to sort types of limestones, but excavators noted the approximate frequencies of fossiliferous vs. nonfossiliferous limestones, which come from different geologic formations or facies. Some varieties of sandstone, fine- to coarse-textured sand grains cemented by silica and carbonates, are found in the Cretaceous deposits in the Fort Hood area. Other types of sandstone appear to be nonlocal in origin. Hematite nodules—iron oxide concretions in advanced stages of weathering—occur naturally in certain localities (e.g., Paluxy sediments).

All chert specimens, regardless of artifact class, were compared with the established Fort Hood chert typology. Because central Texas is so important as a chert resource area for local and extraregional use (Shafer 1993:55), much attention has been devoted to developing a typology of the chert resources present on Fort Hood (Abbott and Trierweiler 1995b; Dickens 1993a, 1993b; Frederick and Ringstaff 1994). The Fort Hood chert typology established by previous researchers was employed in this study and is summarized in Table 4.4.

Completeness

Each stone artifact is classified as complete, nearly complete, proximal fragment, medial fragment, distal fragment, edge fragment, indeterminate fragment, or barb. A nearly complete specimen is one that is missing only a small portion (ca. 1 to 15 percent of the whole artifact), but the size and shape of the whole specimen can be easily determined. For incomplete specimens, no attempt was made to interpret the nature of the break (manufacture vs. use breaks).

Cortex

The amount of cortex present on a chipped stone artifact provides evidence of the raw material source and can reveal much about the stage of manufacture. Cortex on each chipped stone artifact was classified as 0 percent, 0–50 percent, 50–99 percent, or 100 percent. No attempt was made to describe different types of cortex.

Patination

The degree of patination on chert artifacts was noted as being none, light, or heavy. Patination is the complex weathering process by which cherts develop a colored rind around their exterior surfaces. With respect to central Texas cherts, Frederick et al. (1994:6) use the term patina to refer to the weathering rind that is visible in petrographic thin sections and is "white or light gray to the unaided eye." Patination is a time-dependent process and can be used grossly as an age indicator, although the absence of patination says nothing about an artifact's age. There are too many variables involved in the chemical process of patination to derive meaningful chronological interpretations based on variations in the degree of patina (Frederick et al. 1994:37–38).

Heating

Stone artifacts exhibiting evidence of low- to moderate-intensity heating—such as slight

Table 4.4. Fort Hood chert types

Type No.	Type Name	Abbreviation	Geographic Chert Province*
1	Heiner Lake Blue-Light	HLB-LT	Southeast Range
2	Cowhouse White	CW	Southeast Range
3	Anderson Mountain Gray	AMG	West Fort
4	Seven Mile Mountain Novaculite	SMN	Southeast Range and West Fort
5	Texas Novaculite	TN	Southeast Range
6	Heiner Lake Tan	HLT	Southeast Range
7	Fossiliferous Pale Brown	FPB	Southeast Range
8	Fort Hood Yellow	FHY	North Fort
9	Heiner Lake Translucent Brown	HLTB	Southeast Range
10	Heiner Lake Blue	HLB	Southeast Range
11	East Range Flat	ERF	North Fort
13**	East Range Flecked	ER FLECKED	Southeast Range
14	Fort Hood Gray	FHG	North Fort
15	Gray-Brown-Green	GBG	North Fort
16	Leona Park	LP	North Fort
17	Owl Creek Black	OCB	North Fort
18	Cowhouse Two Tone	CTT	Cowhouse
19	Cowhouse Dark Gray	CDG	Cowhouse
20	Cowhouse Shell Hash	CSH	Cowhouse
21	Cowhouse Light Gray	CLG	Cowhouse
22	Cowhouse Mottled with Flecks	CMF	Cowhouse
23	Cowhouse Banded and Mottled	CBM	Cowhouse
24	Cowhouse Fossiliferous Light Brown	CFLB	Cowhouse
25	Cowhouse Brown Flecked	CBF	Cowhouse
26	Cowhouse Streaked	CS	Cowhouse
27	Cowhouse Novaculite	CN	Cowhouse
28	Table Rock Flat	TRF	Cowhouse
29	indeterminate white	–	–
30	indeterminate yellow	–	–
31	indeterminate mottled	–	–
32	indeterminate light gray	–	–
33	indeterminate dark gray	–	–
34	indeterminate light brown	–	–
35	indeterminate dark brown	–	–
36	indeterminate black	–	–
37	indeterminate blue	–	–
38	indeterminate red	–	–
39	indeterminate nonlocal	–	–

* Geographic chert provinces as defined by Abbott and Trierweiler (1995:Figure 8.14).
** No Type 12 was assigned.

discoloration, reddening, or a glossy surface texture—may have been intentionally heat treated. When artifacts were intensively heated—as evidenced by heat spalling, fracturing, or crazing—it is likely that the heating was accidental. Unfortunately, distinguishing between intentional and accidental heating is very subjective. For this analysis, degree of heating was recorded as none, low, or high for all stone artifacts, and chert specimens that exhibit low- to moderate-intensity heating are thought to represent intentionally heat-treated pieces.

Metric Attributes

For most stone tools the only measurements taken were maximum length, width, and thickness. For projectile points the standard measurements taken were maximum length, blade length, blade width, haft width, neck width, base width, and maximum thickness. All measurements were taken in millimeters with digital calipers and read to one-tenth of a millimeter. Measurements on stone tools are consistent with those described by Yohe (1996).

RESULTS OF NATIONAL REGISTER TESTING

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5

Twenty subareas at 19 sites were formally tested during the 2000–2001 field season (see Table 4.1). National Register testing was conducted at 7 rockshelters, 11 open campsites, 1 open campsite/burned rock midden, and 1 burned rock mound. Site investigations are presented in trinomial site number order in this chapter, but select site types (such as rockshelters) are discussed as units in Chapter 7. At these sites, 114 backhoe trenches, 71 test units (64.04 m^3), and 3 shovel tests were excavated; a total of 26 analysis units are identified; and 22 radiocarbon dates were obtained.

41BL43

Site Setting

Situated along a vertical limestone bluff directly beneath the upland rim, 41BL43 consists of a large, south-facing rockshelter overlooking Cowhouse Creek (Belton Reservoir). A looter's trench and backdirt are still visible at the west end of the rockshelter, and areas along the talus edge have been subjected to dripline erosion. Large boulders of roof fall occur on the talus slope and at the east site margin. Vegetation on the talus slope includes juniper, Texas mountain laurel, hackberry, and cedar sage. Site elevation is 240 m above mean sea level.

Previous Work

Stephenson (National Park Service, River Basin Surveys) first recorded the site on 22 July 1949. No detailed information was noted on the site form, nor was a site map drawn. A site card stated that the rockshelter was "deemed not significant" and no further work was necessary.

Moore and Ensor (Texas A&M University) revisited the rockshelter on 4 April 1984 (Carlson et al. 1986:257–258). They recorded maximum site dimensions as 30x17 m with soil deposits at least 10 cm thick. Looter's holes and a trench measuring ca. 10.00x0.75x0.40 m, along with a metal screen, were depicted on the site sketch map. Burned rocks, mussel shells, flakes, a biface, and charcoal were observed. Erosion and looting affected an estimated 15 percent of the rockshelter.

On 2 February 1993, Abbott and Mehalchick (Mariah Associates) visited and reevaluated the site. The large rockshelter was situated beneath a thick (ca. 7 m), hard limestone ledge on the margin of the Manning surface. The maximum site dimensions were modified to 30x8x5 m. The shelter was fronted by a steep, relatively coarse talus slope. It was bounded on the west by a deep rill formed by an ephemeral drainage and on the east by a sloping, boulder-strewn bedrock surface. The shelter fill consisted of light gray silt that contained abundant inclusions of coarse limestone spall. Based on limited stratigraphic exposures from looting, one or more thin ashy lenses appeared to be present. Under the dripline, the fine-grained fill was winnowed, leaving a dense armor of coarse particles. Angular limestone fragments ranging from a few centimeters to several meters in size were intermixed with a dark brown clay loam on the talus slope.

Dense amounts of burned rock, mussel shell, and debitage were exposed along the upper edge of the talus where looter's backdirt was being washed away by dripline runoff. Also exposed by this process was Feature 1, a burned rock concentration measuring 55x40 cm. Buried at 10–15 cm, it was unclear whether the concentration represented an intact feature or discard from looting. In another vandalized area along the talus edge, mussel shells and flakes were observed at 20 cm. Flakes, mussel shells, bones, and burned rocks were noted along the looter's trench recorded in 1984, and the metal screen was still present. Bifaces, edge-modified flakes, pieces of quartz, and charcoal were scattered across the shelter floor. Much of the charcoal was obviously recent, as evidenced by the presence of a modern hearth and partially burned timber. Because the rockshelter had the potential to contain discrete cultural deposits, shovel testing was warranted.

On 19 February 1993, a crew excavated two shovel tests and one 50x50-cm test quad. Placed in the western half of the rockshelter north of the looter's trench, both shovel tests encountered bedrock at 5 cm and were culturally sterile. Excavated to bedrock at 50–60 cm, Test Quad 1 was located next to (north of) Feature 1. Debitage and bones were found from the surface to 30 cm, with burned rocks associated with Feature 1 noted in all 10-cm levels. Mussel shell fragments and charcoal were also observed throughout the deposit. Based on these results, the rockshelter had the potential to contain intact archeological deposits. The recommended testing to determine National Register eligibility was a minimum of 2 m^2 of manually excavated test units (Trierweiler, ed. 1994:A3–7).

Work Performed

The rockshelter was re-inspected before excavation. The looter's trench recorded in 1984 was still recognizable, but other smaller holes plotted on previous sketch maps were practically indistinguishable. The looter's trench had maximum dimensions of 10.0x1.4x0.3 m, with backdirt adjacent to the southern edge of the trench. As noted in 1993, portions of the backdirt were washed away by dripline runoff, exposing dense cultural materials near the talus edge. Large subsurface pieces of roof fall were visible along the southern trench edge, and the modern hearth noted in 1993 was observed.

On 3 May 2000, formal testing of 41BL43 was completed (Figure 5.1). The excavations consisted of two 1x1-m test units (Test Units 1–2); a total of 1.05 m^3 was manually excavated. Both test units were excavated to bedrock. Excavated to 20 cm, Test Unit 1 was placed 60 cm north of the looter's trench and 2.25 m south of the back wall. Test Unit 2 was situated about 8 m east of Test Unit 1, 3.75 m south of the back wall, 1 m southeast of the modern hearth, and 1.5 m west of large roof fall boulders. Based on the 1993 site sketch map, Test Unit 2 is just west of the previously excavated 50x50-cm test quad. The excavation encountered bedrock at 138 cm.

In January 2001, the faunal analyst identified several bone fragments as possibly human. On 26 February 2001, these remains were examined by an osteologist, who verified that they were human remains (Joan E. Baker, personal communication 2001). Dr. Cheryl Huckerby (Fort Hood Cultural Resource Office) was immediately notified of the findings.

Site Extent and Depth

The site is confined to the rockshelter, which has maximum dimensions of 33.0x8.2x4.5 m, but sediments are present in an area measuring approximately 30 m east-west by 4.2 m north-south. The western portion of the rockshelter, along the edge of the overhang, exhibits active erosion from dripline runoff. A peak in cultural materials and an associated radiocarbon date indicates that at least one isolable prehistoric component is present in the upper 40–60 cm of deposits.

Sediments and Stratigraphy

The 119-cm-thick profile observed in Test Unit 2 reflects Type 1 sediment (Abbott 1995b:833–837). At 0–6 cm, the AC_1 horizon is a grayish brown gravelly sandy loam with subangular limestone pebbles. At 6–32 cm, the matrix consists of a gray sandy loam with many burned rock fragments and subangular pebble-sized limestone roof fall. The lower 87 cm of fill contains roof fall fragments in a light gray sandy clay loam underlain by bedrock.

Cultural Materials

From the surface to 20 cm, Test Unit 1 contained debitage, animal bones, abundant modern charcoal, and a cigarette butt. None of the prehistoric materials were collected because this 20-cm-thick deposit was severely disturbed.

Dense cultural materials were found in Test Unit 2 from the surface to 40 cm (Table 5.1).

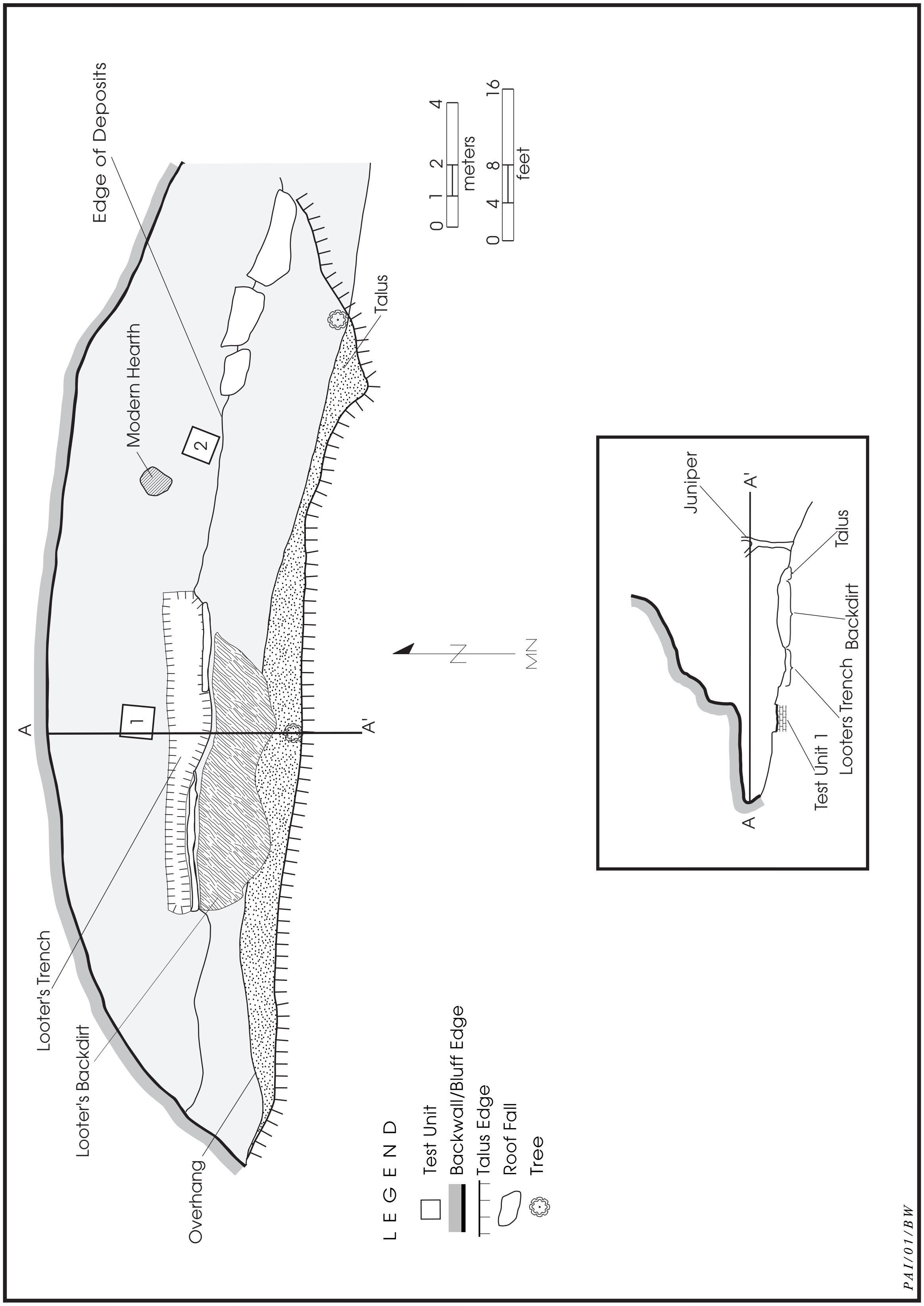

Figure 5.1. Plan and profile of 41BL43.

Modern charcoal was present in the upper 20 cm of fill, and human skeletal remains occurred between 0 and 30 cm (see Human Remains below). A hummocky surface, disarticulated and fragmentary human bones, modern charcoal, and an animal burrow in the southwest quadrant indicate that the upper 20 cm of deposit lacks contextual integrity, and some disturbances may have extended to 30 cm. The cultural materials recovered from 30 to 40 cm include a Scallorn arrow point, and charcoal fragments collected at 37 cm yielded a conventional radiocarbon age of 820 ± 40 B.P. (Beta-149097). A large (85x55 cm), immovable boulder covered and extended beyond the southern half of the excavation from 31 to 70 cm, but sediment was present beneath the base of the slab. Each level from 40 to 100 cm contained cultural materials, but these were exceedingly sparse from 60 to 100 cm. Charcoal collected at 85 cm yielded a conventional radiocarbon age of 1170 ± 40 B.P. (Beta-149098). The excavation was culturally sterile from 100 to 130 cm, and there was another immovable slab across the southern two-thirds of the unit at 110 cm. One flake was found at 130–138 cm, and the excavation was terminated at bedrock.

Human Remains

A total of 45 human bones were present in Test Unit 2 at 0–30 cm, with 66.6 percent of the remains found in the upper 20 cm of clearly disturbed deposits. Four bones were more than 75 percent complete, 3 bones were 25–75 percent complete, and 38 bones were less than 25 percent complete. Most showed evidence of postmortem fracture. Thirty-nine elements were identified as rib and vertebra; the remaining 6 consisted of 2 scapula elements and 1 each of zygomatic, phalanx (hand), metatarsal, and humerus (Buikstra and Ubelaker, eds., 1994). The commingled remains represented two individuals. Excluding the humerus, which was from an infant less than 6 months old, all of the remains were of an adult probably 40–50 years old. Arthritic development was observed on the vertebrae.

Discussion

The testing reveals that looting, bioturbation, and dripline erosion have affected much of the western half of this large rockshelter. All of the deposits in Test Unit 1 and at least the upper 20 cm of Test Unit 2—which yielded most of the human remains—exhibit evidence of these disturbances. At least one isolable cultural component is present in the east half of the shelter, however, and was observed in Test Unit 2. A lens of cultural materials at 20–40 cm associated with a Scallorn arrow point and a calibrated radiocarbon date (2-sigma range) of A.D. 1160–1280 indicates that the shelter was occupied during the Late Prehistoric period, near the transition from Austin to Toyah phase.

Approximately 45 cm below the stratigraphically discrete component, a calibrated radiocarbon date (2-sigma range) of A.D. 770–980 suggests that the rockshelter deposits correlate to the early Austin phase. Based on the excavation of Test Unit 2, the exposure provided by the looter's trench, large pieces of limestone visible on the surface, and variable color and weathering of the ceiling, it appears that a line of roof fall occurs approximately halfway between the back wall and the talus edge. This series of rocks extends most of the length of the shelter, and possibly represents a single roof collapse episode. The two calibrated dates and position of the slabs indicate that this event occurred during the Austin phase, and the rockshelter continued to be occupied postcollapse.

A total of 456 stone artifacts consisting of 11 tools, 1 core, and 444 flakes were recovered (see Table 5.1). Flake tools exhibiting minimal modification and biface fragments dominate the tool assemblage. Most of the debitage consists of noncortical flakes (85.8 percent), suggesting that cores and blanks were produced at another location and then brought to the site. Of the flakes, 79.1 percent are less than 1/4-inch in minimum length, suggesting that much of the reduction focused on late-stage tool production. A qualitative examination of platform remnants on flakes revealed many lipped and faceted platforms diagnostic of late-stage soft-hammer biface thinning. Small parallel-sided flakes with small lipped platforms suggest that some flakes were produced by pressure flaking (Frederick and Ringstaff 1994:166), which also indicates late-stage tool production.

Considerable diversity of chert types was noted in the stone artifact assemblage. Of the known chert types, a nearby resource, Cowhouse

Table 5.1. Summary of cultural materials from 41BL43, Test Unit 2

Provenience	Arrow Point	Late-stage to Finished Bifaces	Spokeshave	Edge-modified Flakes	Core	Unmodified Debitage	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 1 (0–10 cm)*	–	2	–	1	–	67	70	24	2	11	1.50
Level 2 (10–20 cm)*	–	1	1	–	–	95	97	13	6	20	2.00
Level 3 (20–30 cm)*	–	1	–	1	1	169	172	19	5	48	7.00
Level 4 (30–40 cm)	1	–	–	1	–	73	75	10	1	19	2.50
Level 5 (40–50 cm)	–	–	–	1	–	14	15	4	3	8	1.00
Level 6 (50–60 cm)	–	–	–	1	–	21	22	–	–	7	0.25
Level 7 (60–70 cm)	–	–	–	–	–	2	2	2	1	1	0.10
Level 8 (70–80 cm)	–	–	–	–	–	1	1	1	–	–	–
Level 9 (80–90 cm)	–	–	–	–	–	1	1	–	–	–	–
Level 10 (90–100 cm)	–	–	–	–	–	–	0	–	–	1	0.10
Level 14 (130–138 cm)	–	–	–	–	–	1	1	–	–	–	–
Totals	1	4	1	5	1	444	456	73	18	115	14.45

* Human bones were recovered from these levels. Deposits from 0 to 20 cm were disturbed.

White, makes up the largest percentage (18.9 percent) of the stone artifacts. Chert types from the North Fort Chert Province (including Gray-Brown-Green, Fort Hood Yellow, Fort Hood Gray, Owl Creek Black, and Texas Novaculite) are the second most abundant cherts (6.6 percent) identified. The Heiner Lake group (including Heiner Lake Blue, Tan, and Lake Translucent Brown) account for 5.7 percent of the assemblage. Fossiliferous pale brown and Anderson Mountain gray account for only 4.1 percent of the assemblage. The remaining color and texture diversities within the cherts from indeterminate sources (64.7 percent) probably represent variability within known bedrock sources, upland lag gravels, and bedload cherts from Cowhouse Creek. A qualitative examination of cortex reveals the presence of rough and relatively unweathered cortex as well as highly polished cortex, suggesting raw material acquisition from both upland lag gravel and bedload sources.

Of the 73 vertebrate faunal remains, 60.3 percent consist of canid- to deer-sized mammal bones. Only 11 percent of the bones are burned, and 9.6 percent of the bones exhibit spiral fractures. Half of the 18 recovered mussel shells represent five different taxa, and the rest are unidentified.

Based on the testing results, 41BL43 is recommended as eligible for listing in the National Register. The presence of human remains also requires compliance with the Native American Graves Protection and Repatriation Act.

41BL142-A

Site Setting

Site 41BL142 consists of a small rockshelter and adjacent upland lithic scatter. An east-west two-track road and a south-flowing unnamed tributary of Owl Creek (Figure 5.2) cross the site. The upland supports a dense oak-juniper woodland, with chinquapin oak, cedar elm, Texas ash, and columbine noted in the vicinity of the rockshelter. Site elevation is 260 m above mean sea level.

Previous Work

Rogers (Fort Hood Archeological Society) recorded the site on 15 April 1972; it was situated on top of a ridge, and a spring-fed drainage was noted in the valley below. The 5x5-m site consisted of a lithic scatter containing debitage and three projectile point fragments. A cursory survey of the area below the ridge revealed that various small rockshelters were present and that further investigations were needed. Identified artifacts consisted of a possible Tortugas dart point, a Darl dart point fragment, an unidentifiable point tip, one unifacial and four bifacial knives, and two grinding stones. No site map was drawn.

Dureka, DeMarcay, McReynolds, Rotunno, Masson, and Strychalski (Texas A&M University) recorded the site on 5 March 1987 (Mueller-Wille and Carlson 1999b:109–110). The site subsumed a rockshelter at the foot of the escarpment and an associated lithic scatter on the plateau above. It had maximum dimensions of 150x112 m, and the rockshelter measured 12.0x4.0x4.5 m. Debitage, stone tools, a mano, burned rocks, cores, and hammerstones were observed. Arrow and dart points, bifaces, and a spokeshave were collected from the plateau, and one biface was recovered from the rockshelter. The depth of the deposits on the plateau and in the shelter appeared to be less than 20 and 40 cm. Vehicle damage and erosion affected an estimated 40 percent of the plateau; looting and roof fall disturbed 30 percent of the shelter. Looter's holes and a backdirt pile were drawn on the sketch map of the rockshelter.

On 14 September 1992, Abbott and Kleinbach (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A18–A20). Based on differing archeological potentials and geomorphic contexts, the site was divided into Subareas A and B. Based on the extent of surficial cultural materials, the overall site size was reduced slightly, to 130x110 m.

Subarea A consisted of a west-northwest-facing rockshelter that measured 10x3x3 m. The sediment consisted of a very stony grayish brown silty loam derived from spalling of the shelter roof. A thick apron of travertine mantled the back wall of the shelter, indicating considerable groundwater discharge; lenses of hard travertine also were thought to be interbedded in the matrix. A spring-fed tributary less than 3 m below the shelter floor suggested that occasional alluvial deposition and erosion may have occurred. Flakes, bones, and mussel shells were scattered across the shelter floor, but charcoal

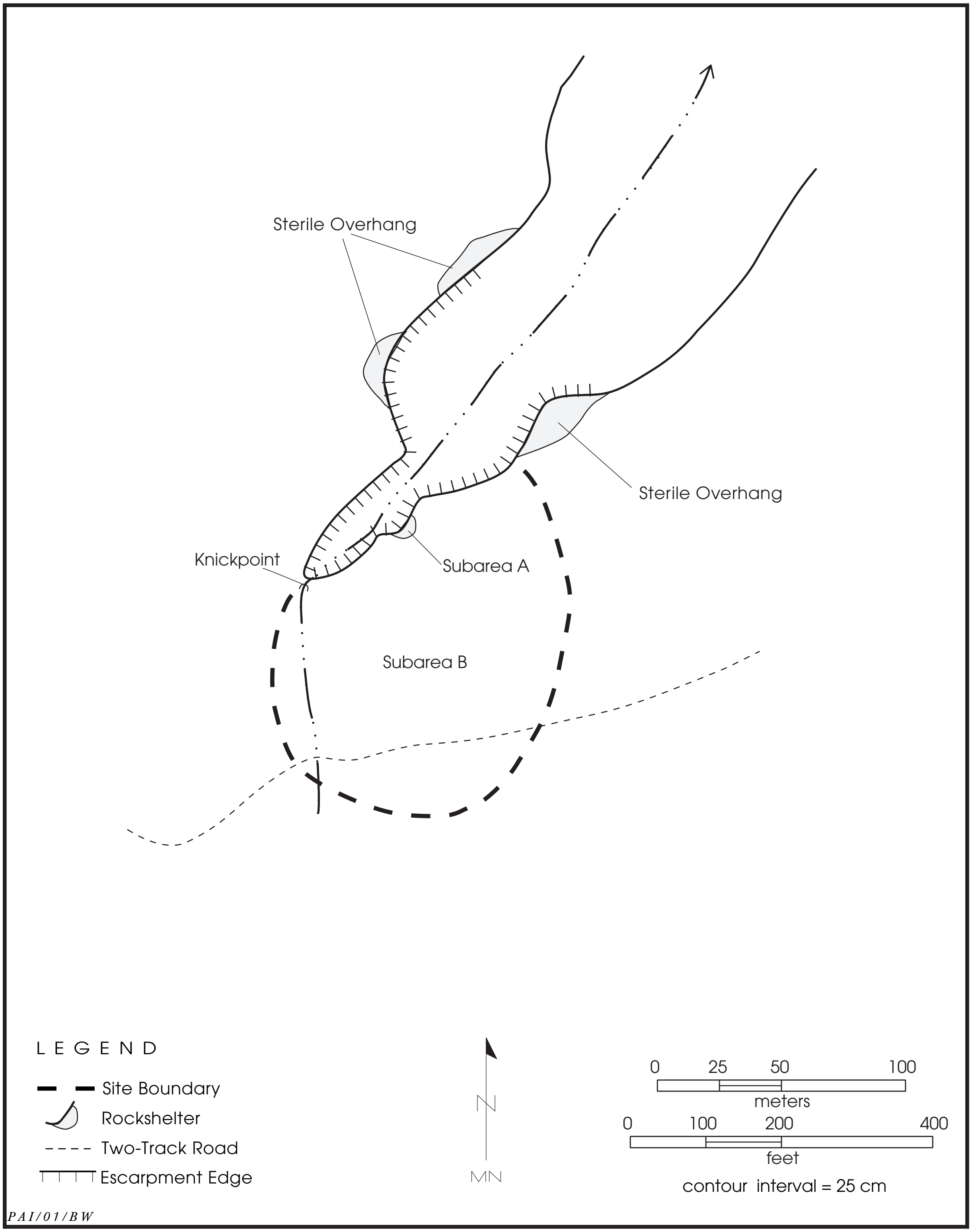

Figure 5.2. Site map of 41BL142 (modified from 1992 site sketch map).

on the surface appeared to be from recent fires. A mound of dirt was noted at the north edge of the shelter, but no looter's holes were apparent. Because the rockshelter had the potential to contain discrete cultural deposits, shovel testing was warranted in Subarea A. Three more shelters were investigated within the immediate area, but each lacked appreciable deposits and required no further work.

Subarea B subsumed the upland (Manning) surface, which was mantled with a relatively thin (<20 cm), organic-rich dark reddish brown stony clay loam that represented a residual soil with minor reworking by sheetwash. Away from the edge of the escarpment, this soil thinned considerably, and bare limestone was exposed in a number of places. Debitage and bifaces were strewn across the surface. Because there was limited potential for intact archeological deposits, no further work was recommended for Subarea B.

On 30 September 1992, a crew excavated two shovel tests in the shelter (Subarea A). Although no looter's holes had been observed during the reconnaissance visit 16 days earlier, three small, fresh potholes were present at this time. The shovel tests were placed near the east and west margins of the shelter and in front of the travertine deposit along the back wall. The shovel tests produced flakes, burned rocks, a biface, a modified flake, a side scraper, charcoal, and mussel shell fragments from 0 to 40 cm. Most of the artifacts occurred at 0–10 cm, and bedrock was encountered at 40–42 cm in both tests. Based on these results, the rockshelter had the potential to contain intact archeological deposits. The recommended testing effort to determine National Register eligibility consisted of a minimum of 2 m^2 of manually excavated test units (Trierweiler, ed. 1994:A19).

Work Performed

On 2 May 2000, formal testing of Subarea A at 41BL142 was completed (Figure 5.3). Two contiguous 1x1-m test units (Test Units 1 and 2) were excavated, and a total of 1.25 m^3 of fill was manually removed. Although no looter's holes were discernable, the mounded pile of dirt noted in 1992 at the north-northeast margin of the shelter was observed.

Test Unit 1 was excavated near the center of the shelter and approximately 1.25 m from the back wall. Sloping from west to east, bedrock was exposed across the unit between 5 and 70 cm.

Situated at the dripline but primarily within the overhang, Test Unit 2 was contiguous with (west of) Test Unit 1. Level 1 (0–10 cm) was not present in Test Unit 2 because of the slope of the surface. Bedrock at 90–120 cm dipped from west to east across the unit.

Site Extent and Depth

The site consists of a rockshelter with maximum dimensions of 12.0x5.3x3.7 m. Although the sediments in the shelter are up to 120 cm thick, the excavations did not encounter isolable cultural components below bioturbated deposits.

Sediments and Stratigraphy

The 75-cm-thick profile of Test Unit 2 correlates to Abbott's (1995b:833–837) Type 3 and 1 sediments. The A horizon (0–25 cm) formed in Type 3 sediments and is characterized by black sandy clay loam with moderate medium subangular blocky structure and common subangular limestone cobbles. The underlying C horizon (25–75 cm) consists of Type 1 sediments that contain many subangular limestone boulders in a sandy clay loam matrix.

Cultural Materials

Test Unit 1 contained lithic artifacts, burned rocks, and modern charcoal and partially burned wood from the surface to 40 cm (Table 5.2). Travertine was present in the southeast quadrant of the unit at 0–10 cm and expanded to cover half of the excavation unit at 10–20 cm. This deposit was underlain by bedrock between 5 and 22 cm in the southern half of the unit. Dense amounts of rocks and spalls (some up to 20x15x5 cm) were present at 40–70 cm, but no cultural materials were observed.

From 10 to 70 cm, Test Unit 2 produced cultural materials that include 94 pieces of unmodified debitage, 1 Bonham and 1 Scallorn arrow point, and 2 chipped-stone tools. There were modern charcoal and many limestone spalls from 10 to 50 cm. Three artifacts at 60–70 cm were recovered from an animal burrow or old looter's hole. The test unit was devoid of cultural materials from 70 to 120 cm.

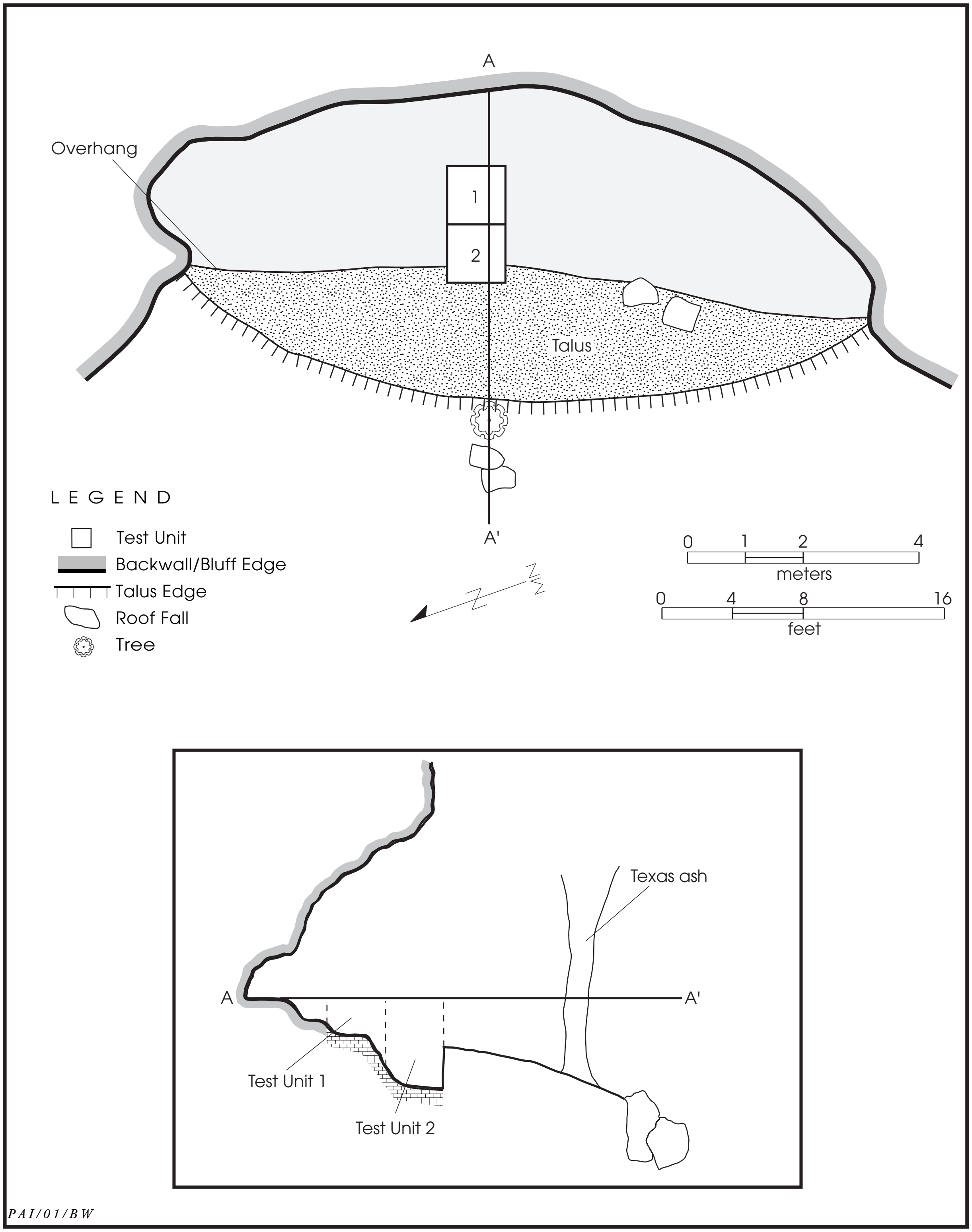

Figure 5.3. Plan and profile of 41BL142-A.

Table 5.2. Summary of cultural materials from 41BL142-A, Test Units 1 and 2

Provenience	Arrow Points	Early- to Middle-stage Biface	Late-stage to Finished Biface	Edge-modified Flake	Unmodified Debitage	Artifact Totals	Unmodified Bone	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1									
Level 1 (0–10 cm)	–	–	–	–	2	2	–	–	–
Level 2 (10–20 cm)	–	–	1	–	16	17	–	5	0.25
Level 3 (20–30 cm)	–	–	–	–	13	13	–	2	0.10
Level 4 (30–40 cm)	–	–	–	–	2	2	–	–	–
Subtotals	0	0	1	0	33	34	0	7	0.35
TEST UNIT 2									
Level 2 (10–20 cm)	–	1	–	–	1	2	–	–	–
Level 3 (20–30 cm)	–	–	–	1	42	43	–	2	0.20
Level 4 (30–40 cm)	–	–	–	–	7	7	1	2	0.10
Level 5 (40–50 cm)	1	–	–	–	37	38	–	–	–
Level 6 (50–60 cm)	–	–	–	–	5	5	–	2	0.20
Level 7 (60–70 cm)	1	–	–	–	2	3	–	–	–
Subtotals	2	1	0	1	94	98	1	6	0.50
Totals	2	1	1	1	127	132	1	13	0.85

Discussion

The upper 40–50 cm of deposits in the two test units yielded a moderate amount of cultural materials. These archeological remains lack contextual integrity, however, indicated by the presence of modern wood charcoal and evidence of bioturbation and possible looting. No stratigraphically discrete cultural components were encountered below the level of disturbance. Although they were found in disturbed contexts, the recovery of Bonham and Scallorn arrow points suggests that the shelter was occupied during the Late Prehistoric period, Austin phase. Based on the testing results, 41BL142-A has limited archeological research potential and is recommended as not eligible for listing in the National Register.

41BL231

Site Setting

This large site is situated on an upland surface, side slope, and terrace south of an unnamed, spring-fed tributary of Bull Branch (Figure 5.4). The area also encompasses a small rockshelter located just below the upland rim. A gravel road that parallels a water pipeline originating at Belton Reservoir approximately 2.25 km to the east crosses the site. Most of the site area supports a dense oak-juniper woodland. Site elevation is 230 m above mean sea level.

Previous Work

Bundy (Texas Archeological Survey) first recorded the site on 7 February 1980. It consisted of a lithic scatter and burned rock midden extending 525x300 m. Flakes, cores, scrapers, bifaces, projectile points, mussel shells, and burned rocks were observed, and one Plainview point was collected. Erosion and a road disturbed an estimated 30 percent of the site. Carlson et al. (1986:263–264) revisited and reported the site and later classified it as a lithic resource procurement area for management purposes.

On 8 June 1993, Kleinbach and Abbott (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A116–A122. Based on

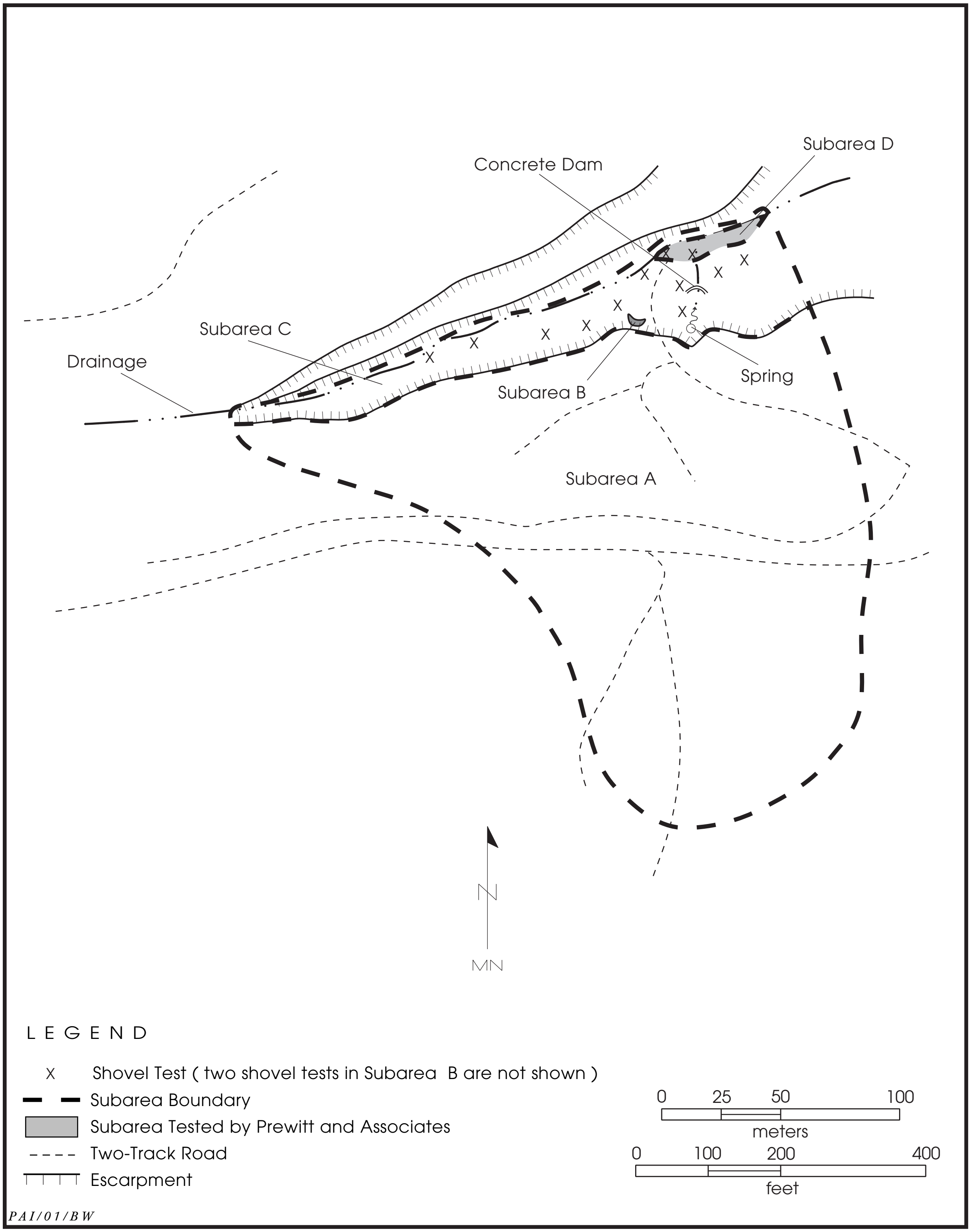

Figure 5.4. Site map of 41BL231 (modified from Trierweiler, ed. 1994:A117).

differing archeological potentials and geomorphic contexts, the site was divided into Subareas A–D. Based on the extent of cultural materials and Holocene-aged deposits, its dimensions were enlarged to 525x510m.

Subarea A subsumed a gently sloping Manning surface on which a lithic and burned rock scatter was exposed. The central portion of the upland was mantled with a truncated residual soil that was completely eroded along the margins of the surface. No significant chert resource was observed on Subarea A, but sparse chert nodules were noted at the south end of the subarea. A moderate amount of debitage was scattered across the surface, and dense flakes, scattered burned rocks, and a few mussel shells were exposed on the upland above Subarea B (a rockshelter). Because there was negligible potential for intact cultural deposits, no further work was recommended for Subarea A.

Subarea B consisted of a rockshelter located just below the escarpment edge in the north-central portion of the site. The shelter measured approximately 8x4x1 m, and a few flakes, burned rocks, and several mussel shells were observed. The fill consisted of reddish brown clay loam, up to 20 cm thick, that appeared to be reworked from the upland. A large fragment of roof fall was present at the east end of the shelter, and smaller pieces were strewn along the talus edge. Two shallow potholes and lumber were drawn on the sketch map. Erosion and looting had moderately disturbed the rockshelter.

Subarea C subsumed the side slope of the unnamed tributary of Bull Branch. Inclined 15–30°, the slope was mantled with colluvium and slopewash exhibiting A-C and A-R profiles. Sparse debitage, burned rocks, and mussel shells were scattered across the slope. Sheet erosion, historic modification (a concrete dam), and bioturbation were noted. The historic occupation is recorded as 41BL653 (Carlson et al. 1986:388–389).

Subarea D encompassed a Holocene-aged terrace south of the drainage. Approximately 1.5 m above the modern channel, the terrace fill consisted of a gleyed, gravelly clay loam that graded up into a dark grayish brown clay loam. This fill exhibited an A-Bw-Cg profile that probably correlated to the West Range fill (Nordt 1992). A few flakes, mussel shells, and scattered burned rocks were exposed in some areas. Historic modification (a concrete water tank) and cutbank erosion slightly disturbed the subarea. Because Subareas B, C, and D had the potential to contain intact cultural deposits, shovel testing was warranted in all three.

On 11 June 1993, a crew excavated a total of 14 shovel tests in Subareas B, C, and D (Trierweiler, ed. 1994:A116–A122). In the Subarea B rockshelter, one shovel test was placed along the southern edge of a looter's hole where decaying wooden boards were lying on the surface. At 0–30 cm, this test yielded flakes, bones, and mussel shells, along with glass fragments at 20–30 cm. No cultural materials were found from 30 to 40 cm; one flake was recovered at 40–45 cm, and the test was terminated on bedrock or a large piece of roof fall. Along the talus edge, a second shovel test was located just north of a looter's hole. At 0–50 cm, this shovel test contained similar types of prehistoric cultural materials as the other test. In addition, one Godley dart point was found at 40–50 cm, and roof fall or bedrock was encountered at 55 cm.

Two of 10 shovel tests excavated in Subarea C (the side slope) produced mussel shells and debitage. Most of the tests contained a moderate amount of colluvial gravels, and the excavations were halted on bedrock or a dense gravel deposit between 20 and 50 cm.

Two shovel tests placed in Subarea D (the terrace) yielded cultural materials. The upper 20 cm of deposits in one test located near the west end of the terrace contained flakes, recent charcoal, and historic and modern items. No artifacts were recovered from 20 to 30 cm, but sparse flakes and burned rocks were present at 30–60 cm. No cultural materials occurred at 60–70 cm, and the excavation was terminated. Close to the center of Subarea D, another test contained two small burned rocks at 0–10 cm and was culturally sterile from 10 to 30 cm. Seven burned rocks (possibly a subsurface feature) and one flake were found at 30–50 cm. The excavation was halted at 50 cm because there were burned rocks and roots present.

Based on the testing results, Subarea C had limited potential for discrete cultural components in the colluvial deposits, and no further management was recommended. Subareas B (the rockshelter) and D (the terrace), however, had the potential to contain intact archeological deposits. Researchers also noted that a buffer zone—a portion of the Subarea C side slope—should be included around Subarea B. The recommended testing to determine National Register eligibility consisted of a minimum of 3 m^2 of manually excavated test units in Subarea B and 2–4 m^2 of hand excavations in Subarea D (Trierweiler, ed. 1994:A118–A120).

41BL231-B

Work Performed

Before testing , the rockshelter comprising Subarea B was re-inspected. The rotted lumber and two shallow looter's holes noted in 1993 were still visible. The potholes measured about 2x1 m and 1x1 m in size and disturbed roughly half of the shelter fill within the overhang.

On 4 May 2000, formal testing of 41BL231-B was completed (Figure 5.5). Testing consisted of one 1x1-m test unit (Test Unit 1) and one shovel test (Shovel Test 3); Shovel Tests 1 and 2 were dug in 1993. A total of 0.47 m^3 was manually excavated from Test Unit 1.

Test Unit 1 was placed within the overhang at the west end of the shelter. The northeast edge of the unit overlapped a looter's hole. The excavation was terminated on bedrock encountered between 28 and 47 cm. Within the overhang near the east wall of the shelter, Shovel Test 3 was equidistant to a looter's hole, the pile of decayed lumber, the back wall, and a large boulder. Bedrock was encountered at 40 cm.

Site Extent and Depth

The maximum rockshelter dimensions have been enlarged to 8.0x6.4x1.2 m to encompass the deepest portion of the shelter, which includes a solution cavity at the center of the back wall. In the eastern one-third of the shelter, a large, immovable boulder abuts the east wall and extends almost to the talus edge. Although the excavations yielded cultural materials, no intact subsurface archeological deposits were encountered.

Sediments and Stratigraphy

Resting on bedrock, the 36-cm-thick profile of Test Unit 1 consists of sandy clay loam Type 3 sediments (Abbott 1995b:833–837) containing subangular limestone pebbles derived from within the rockshelter. The A1 horizon (0–6 cm) is a very dark grayish brown sandy clay loam with weak subangular blocky structure and common subangular limestone pebbles. The A2 horizon (6–36 cm) exhibits a stronger coarse subangular blocky structure and slightly more limestone pebbles.

Cultural Materials

In Test Unit 1, each level excavated from the surface to 47 cm contained cultural materials (Table 5.3). Modern charcoal was also present from 0 to 30 cm. Bedrock was exposed between 30 and 40 cm.

Shovel Test 3, excavated to 40 cm, contained 6 flakes, 16 unmodified bones, and bottle glass fragments. Two of the bones recovered at 0–10 cm were identified as a small artiodactyl, probably sheep or goat (both were introduced by Europeans).

Discussion

Although 41BL231-B yielded moderate amounts of cultural materials from the surface to 40 cm, looting and bioturbation have disturbed a substantial portion of this small rockshelter. Modern charcoal, modern glass, and sheep or goat remains are evidence of disturbance throughout the deposits.

41BL231-D

Work Performed

Subarea D consists of a small, discrete section of Holocene-aged terrace with deposits less than 150 cm thick. Access for a backhoe was not practical, so no trenching was conducted. When the tributary cutbank was inspected, several burned rocks were exposed at approximately 40 cm near the west end of the terrace.

On 5 July 2000, formal testing of 41BL231-D was completed (Figure 5.6). Testing consisted of two 1x1-m test units (Test Units 2 and 3). A total of 2.4 m^3 was manually excavated.

Test Unit 2 was placed perpendicular to the cutbank, where burned rocks were exposed at about 40 cm. At 90 cm, there was a large immovable boulder across the south half of the unit. It expanded in size with depth and covered all but the southwest corner of the test unit at 110 cm when the excavation was terminated.

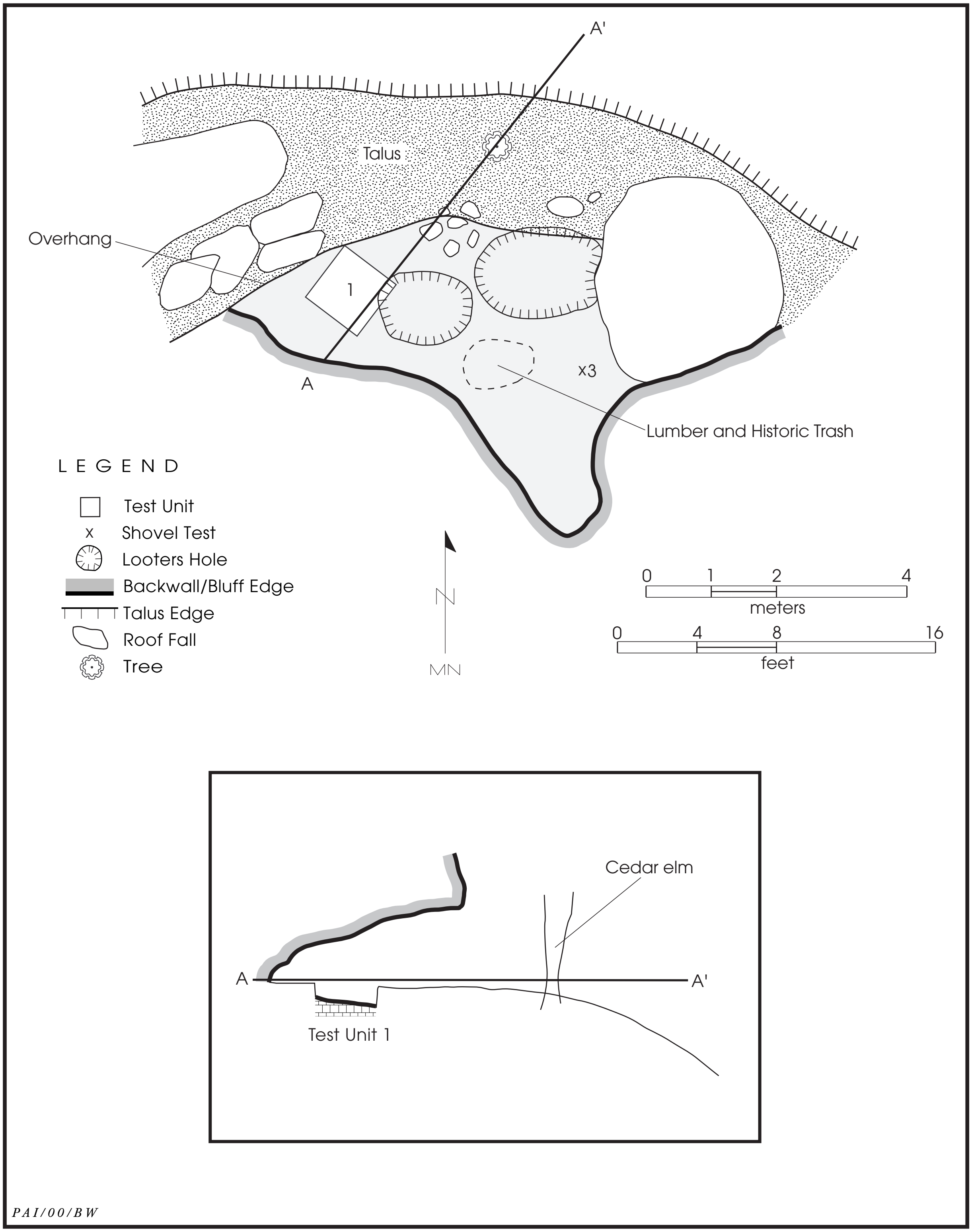

Figure 5.5. Plan and profile of 41BL231-B.

Table 5.3. Summary of cultural materials from 41BL231-B, Test Unit 1 and Shovel Test 3

Provenience	Spokeshaves	Edge-modified Flake	Unmodified Debitage	Artifact Totals	Unmodified Bones	Unmodified Mussel Shell	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1								
Level 1 (0–10 cm)*	–	–	5	5	–	–	–	–
Level 2 (10–20 cm)*	2	–	11	13	4	1	1	0.10
Level 3 (20–30 cm)*	–	–	28	28	2	–	–	–
Level 4 (30–40 cm)	–	1	9	10	–	–	1	0.10
Level 5 (40–47 cm)	–	–	3	3	1	–	–	–
Subtotals	2	1	56	59	7	1	2	0.20
SHOVEL TEST 3								
Level 1 (0–10 cm)	–	–	–	0	11	–	–	–
Level 2 (10–20 cm)**	–	–	–	0	–	–	–	–
Level 3 (20–30 cm)	–	–	2	2	4	–	–	–
Level 4 (30–40 cm)**	–	–	4	4	1	–	–	–
Subtotals	0	0	6	6	16	0	0	0.00
Totals	2	1	62	65	23	1	2	0.20

* Modern charcoal recovered.
** Modern glass fragments recovered.

In the cutbank profile, 20–30 cm of sediment was visible below the boulder, but other large rocks were also present.

About 14 m northeast of Test Unit 2, Test Unit 3 was situated in the vicinity of the previously excavated shovel test containing a possible subsurface burned-rock feature. The unit was terminated on bedrock at 130 cm.

Site Extent and Depth

The terrace gradually pinches out to the east and west and is delimited by the tributary to the north and steep colluvial slope to the south. Thus, 41BL231-D has maximum dimensions of 48 m northeast-southwest by 12 m northwest-southeast. Cultural materials were found to a depth of 110 cm, but one discrete cultural component is buried between 30 and 55 cm in alluvial and colluvial deposits.

Sediments and Stratigraphy

The T_1 is a composite of 1–1.5 m of late Holocene colluvial and slopewash deposits resting on weathered limestone bedrock. These deposits were examined through the profile of Test Unit 3, which exhibits an A-Bw-R soil. The A horizon (0–59 cm) is a very dark gray silty clay loam with matrix-supported angular to subangular (15 percent) gravels. The Bw horizon (59–113 cm) is a grayish brown silty clay loam with matrix-supported angular to subangular (10 percent) gravels.

Cultural Materials

Test Units 2 and 3 yielded burned rocks, chipped stone artifacts, bones, and mussel shells from surface to 120 cm below surface (Table 5.4). Feature 1, an occupation zone, was encountered between 30 and 55 cm in both units (see Cultural Features). A single untyped dart point, possibly a variant of the Fairland type, was recovered from 50 to 60 cm in Test Unit 3.

Cultural Features

Feature 1 extended across Test Units 2 and 3 with the greatest concentration of materials

Table 5.4. Summary of cultural materials from 41BL231–D, Test Units 2 and 3

Provenience	Dart Point	Edge-modified Flake	Unmodified Debitage	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 2								
Level 1 (0–10 cm)	–	–	–	0	–	–	4	0.10
Level 2 (10–20 cm)	–	–	–	0	–	–	47	1.50
Level 3 (20–30 cm)	–	–	–	0	–	–	49	6.00
Level 4 (30–40 cm)	–	–	–	0	–	–	4	0.50
Level 7 (60–70 cm)	–	–	1	1	–	–	1	0.10
Level 8 (70–80 cm)	–	–	1	1	–	–	2	0.25
Level 9 (80–90 cm)	–	–	3	3	–	–	1	0.10
Level 10 (90–100 cm)	–	–	4	4	–	–	2	0.10
Level 11 (100–110 cm)	–	–	3	3	–	–	–	–
Subtotals	0	0	12	12	0	0	110	8.65
Feature 1 (30–40 cm)	–	–	–	0	–	–	43	23.50
Feature 1 (40–50 cm)	–	–	–	0	–	–	68	38.00
Feature 1 (50–55 cm)	–	–	–	0	–	–	10	6.00
Subtotals	0	0	0	0	0	0	121	67.50
TEST UNIT 3								
Level 1 (0–10 cm)	–	–	3	3	–	3	–	–
Level 2 (10–20 cm)	–	–	1	1	–	9	4	0.50
Level 3 (20–30 cm)	–	–	–	0	–	2	4	0.50
Level 6 (50–60 cm)	1	–	1	2	–	–	26	1.50
Level 7 (60–70 cm)	–	–	–	0	–	1	11	2.00
Level 8 (70–80 cm)	–	–	–	0	–	–	1	0.25
Level 9 (80–90 cm)	–	–	–	0	–	–	1	0.25
Level 11 (100–110 cm)	–	–	4	4	–	1	3	1.00
Level 12 (110–120 cm)	–	1	–	1	–	–	–	–
Subtotals	1	1	9	11	0	16	50	6.00
Feature 1 (30–40 cm)	–	–	3	3	–	5	97	23.50
Feature 1 (40–50 cm)	–	–	3	3	9	–	60	14.50
Subtotals	0	0	6	6	9	5	157	38.00
Totals	1	1	27	29	9	21	438	120.15

occurring between 30 and 50 cm. The 20–25 cm thick lens of cultural materials comprises a prehistoric occupation zone dominated by burned rocks and that has a small number of flakes and unmodified bones as well. The burned rocks (105.5 kg in the two units) appeared to be in 2 or 3 layers and dipped toward the north. Approximately half of the rocks were tabular pieces (up to 23x14x5 cm), and the rest were smaller angular fragments. Most of the burned rocks were gray throughout, relatively soft, and had a faint odor of sulfur. Flotation samples from both units contained charred *Carya, Juniperus*, *Quercus*, and *Ulmus* spp. Wood and seeds of *Prunus* sp. and *Panicum* sp. Charcoal collected at 40–50 cm yielded conventional radiocarbon ages of 1220 ± 40 B.P. (Beta-149100, Test Unit 2) and 1160 ± 40 B.P. (Beta-149099, Test Unit 3). The testing results suggest that the occupation zone extends at least 15 m east-west by 10 m north-south, but its full horizontal extent is not known testing was limited. Roots and cutbank

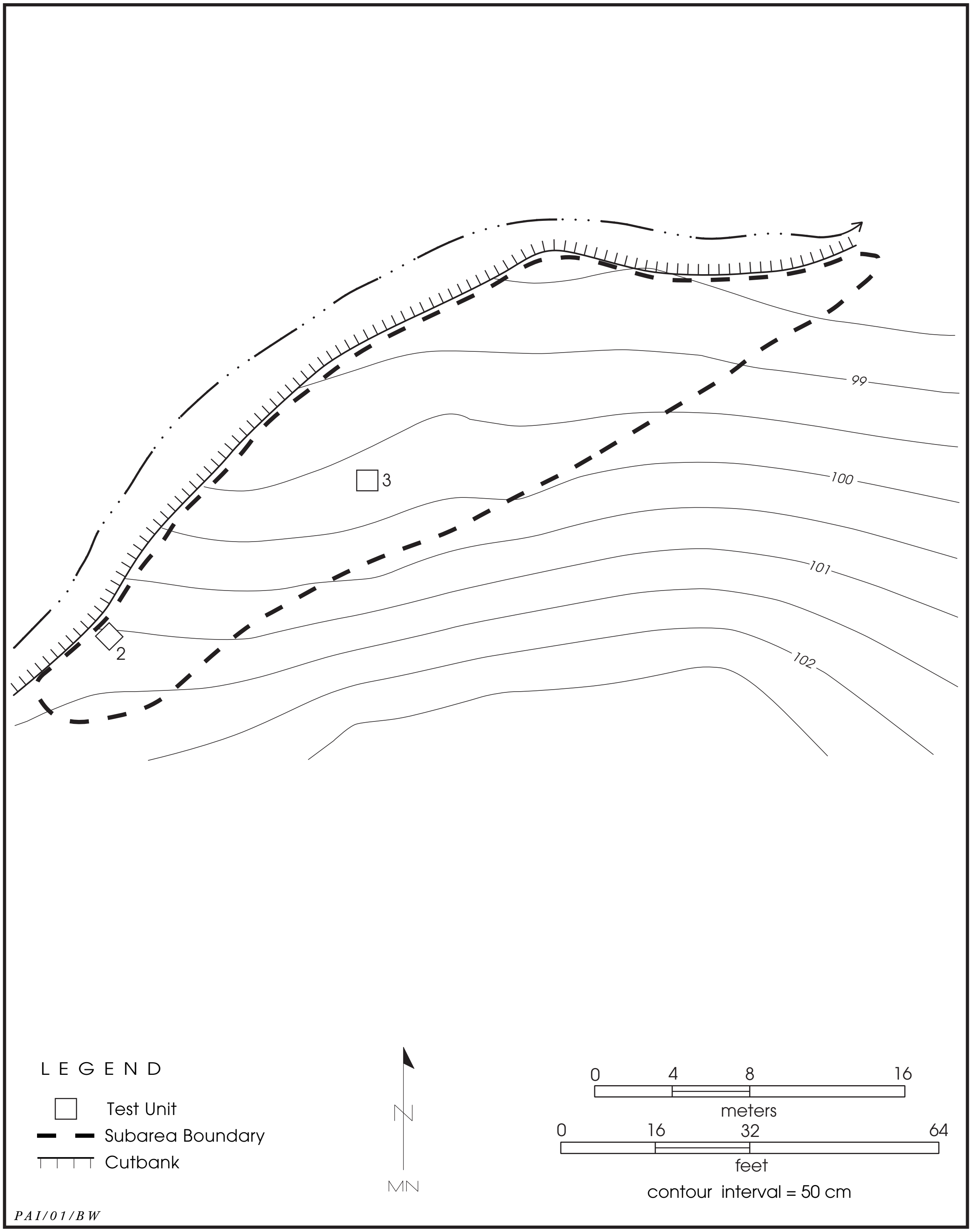

Figure 5.6. Site map of 41BL231-D.

erosion have minimally disturbed the feature.

Discussion

The context of most of the cultural materials encapsulated in the upper 20–30 cm of the A horizon is suspect because there are modern charred wood and unburned limestone fragments present. Toward the base of this horizon, two hand excavations encountered Feature 1, a stratigraphically and horizontally discrete occupation zone. Overlapping calibrated radiocarbon dates (2-sigma range) of A.D. 690–900 and A.D. 780–980 near the base of Feature 1 indicated the area was used during the transition from the Late Archaic to the Late Prehistoric period. The feature fill consisted primarily of burned rocks, with juniper, oak, elm, and hickory wood serving as fuel. Panic grass and wild plum seeds, unidentifiable and canid- to deer-sized bones, and mussel shells are evidence of food sources. All of the bones show angular breakage, but only one specimen is charred. The invertebrate remains consist of *Amblema plicata* and unidentifiable mussel shells. Below Feature 1, no separable cultural component could be identified in the underlying Bw horizon.

The relatively recent radiocarbon dates, coupled with the thinness of the deposits and lack of soil development, suggest that much of the colluvium and alluvium at this locality were stripped away and redeposited within the last 2,000 years. This site seems to reflect a widespread pattern at Fort Hood, where sediments were periodically stripped from low-order streams and transported to the larger trunk streams.

Summary and Conclusions

The rockshelter, 41BL231-B, does not contain intact cultural deposits, and the unconsolidated sediments exhibit evidence of severe disturbance. Thus, 41BL231-B has limited archeological research potential and is not recommended as eligible for listing in the National Register. In contrast, 41BL231-D contains a thin, isolable cultural component encapsulated in late Holocene-aged sediments. This component has the potential to provide information on Late Archaic and Late Prehistoric activities in central Texas. Based on the testing results, site 41BL231-D is recommended as eligible for listing in the National Register.

41BL488-A

Site Setting

Two rockshelters and the associated talus slope situated directly beneath the upland rim comprise 41BL488 (Figure 5.7). Large boulders of roof fall in the area between the two shelters indicate that the overhanging ledges were once connected and formed a single shelter. The site overlooks a deeply incised, unnamed tributary of Bull Branch to the south. The area supports mixed hardwood trees, along with yucca, poison ivy, greenbriar, cedar sage, Virginia creeper, beauty berry, and maidenhair fern. Site elevation is 210 m above mean sea level.

Previous Work

Gray and Bradle (Texas A&M University) recorded the site on 13 December 1983 (Carlson et al. 1986:131). The site subsumed two rockshelters (designated Rockshelters 1 and 2) and the entire slope down to an unnamed tributary of Bull Branch. Maximum site dimensions were defined as 80x28 m. Burned rocks, mussel shells, bones, flakes, bifaces, and scrapers were observed; one arrow and one dart point were collected. Most of the cultural materials noted were in Rockshelter 2, and the depth of the deposits appeared to be more than 1 m. Sediments in Rockshelter 1 were described as shallow. Potholes were depicted on both shelter planviews, particularly in Rockshelter 2. Erosion, military camping, and looting disturbed an estimated 16 percent of the site.

On 2 February 1993, Abbott and Kleinbach (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A215–218). The site was divided into Subareas A and B to account for differing archeological potentials and geomorphic contexts. Based on the extent of the rockshelters, the size of the associated talus slope, and observations of cultural materials, the overall site size was enlarged to 90x40 m.

Subarea A consisted of the two rockshelters and collapsed bluff edge located beneath the high upland (Manning) surface. Rockshelter 1, the easternmost of the two shelters, measured

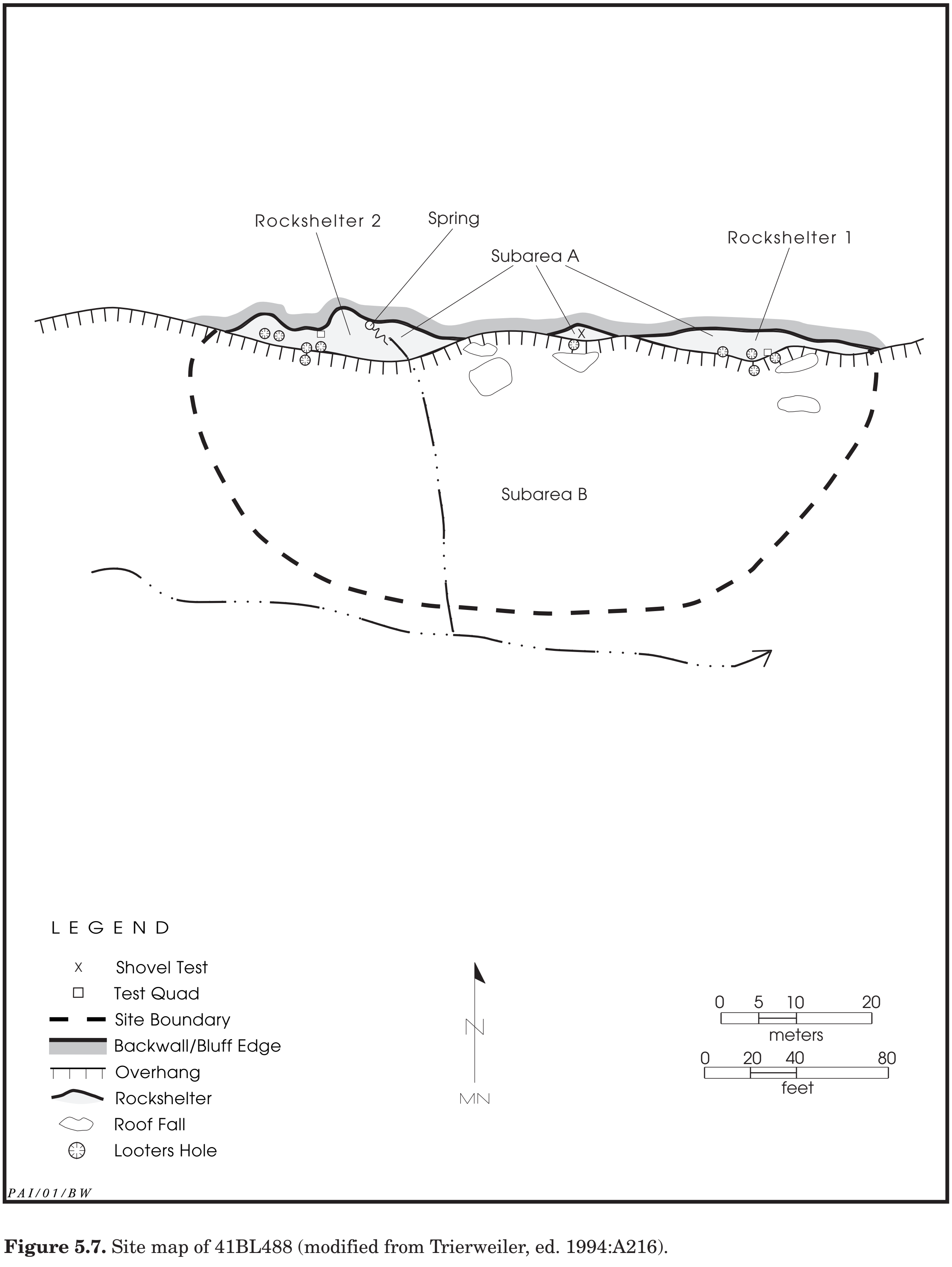

Figure 5.7. Site map of 41BL488 (modified from Trierweiler, ed. 1994:A216).

approximately 12x3x2.5 m. Several very large boulders calved off the escarpment edge on the eastern side represented an extension of the roof ca. 4–5 m further east. Rockshelter 2, located ca. 25 m west of Rockshelter 1, had maximum dimensions of 25x6x2 m. A number of large boulders littered the intervening slope, representing collapsed ledges, suggesting that the two shelters once were part of a single overhanging ledge roughly 80 m long. Both shelters contained fill consisting of a highly organic, very stony grayish brown loam. Although exposures were poor, this sediment averaged 25 cm thick and was not obviously stratified. Sparse burned rocks, flakes, bones, and mussel shells were observed on the floors of both shelters. Each shelter was moderately disturbed by a series of small, shallow looter's holes, some of which appeared very recent. Vandalism, bioturbation, and sheet erosion had disturbed the shelters, particularly at a spring conduit located at the rear of Rockshelter 2. Rockshelters 1 and 2 were considered to possibly contain discrete cultural deposits, so shovel testing was warranted.

Subarea B consisted of the steep colluvial talus slope below and between the two rockshelters. Vegetation was dense. Dipping 25–30° to the tributary, the slope was mantled with a stony black clay loam exhibiting an A-C profile; it was extensively affected by sheet erosion and bioturbation. Because there was limited potential for intact archeological deposits, no further work was recommended for Subarea B.

On 6 April 1993, a crew excavated one shovel test and two 50x50-cm test quads at 41BL488-A (Trierweiler, ed. 1994:A215–A218). In Rockshelter 1, Test Quad 2 was placed just inside the overhang near the center of the shelter. Sparse debitage, burned rocks, one edge-modified flake, and a mussel shell fragment were found from 0 to 20 cm, and the excavation terminated on weathered bedrock at 40 cm. In Rockshelter 2, Test Quad 1 was located near the back wall at the center of the shelter. The test quad yielded one metate fragment, a few bones, mussel shell fragments, flakes, an edge-modified flake, burned rocks, and charcoal. Weathered bedrock was encountered at 40 cm across the unit. One shovel test was excavated in a small alcove located between the two rockshelters. No cultural materials were found, and bedrock was encountered at 20 cm. Based on these results, Rockshelters 1 and 2 (Subarea A) had the potential to contain intact archeological deposits. Recommended testing to determine National Register eligibility consisted of a minimum of 2 m^2 of manually excavated test units (Trierweiler, ed. 1994:A217). No further work was recommended for Subarea B.

Work Performed

On 9 May 2000, formal testing of 41BL488-A was completed. Looter's holes were observed in both rockshelters, but none appeared to be recent. Two 1x1-m test units (Test Units 1 and 2) and one shovel test were located in Rockshelter 1 (Figure 5.8). The shovel-test sequence began with 4 because Shovel Tests 1–3 were excavated in 1993. One 1x1-m test unit (Test Unit 3) was placed in Rockshelter 2 (Figure 5.9). A total of 1.2 m^3 was manually excavated from the three test units.

Test Unit 1 was placed 120 cm south of the back wall and just west of a looter's hole in Rockshelter 1. It was located completely beneath the overhang. Placed beside (south of) Test Unit 1, Test Unit 2 extended 30–40 cm beyond the edge of the overhang. A decayed tree stump and branches were present in the northwest quadrant of the excavation. Test Units 1 and 2 were terminated on indurated bedrock at 60 cm. Shovel Test 4 was excavated at the east end of Rockshelter 1 and bedrock was encountered at 56 cm. The shovel test was located just beyond the edge of the overhang and north of a large boulder. Placed at the west end of Rockshelter 2, Test Unit 3 was situated 110 cm north of the back wall and completely beneath the overhang. The excavation was terminated when bedrock was encountered across the unit between 30 and 36 cm.

Site Extent and Depth

Site 41BL488-A encompasses both rockshelters and the intervening area of roof collapse between them. The two shelters clearly represent opposite ends of a once-larger shelter, with maximum dimensions of 56.00x6.60x3.35 m. This large rockshelter contains evidence of a single, discrete prehistoric occupation in the upper 30–50 cm.

Sediments and Stratigraphy

The deposits exposed in Test Units 1 and 3

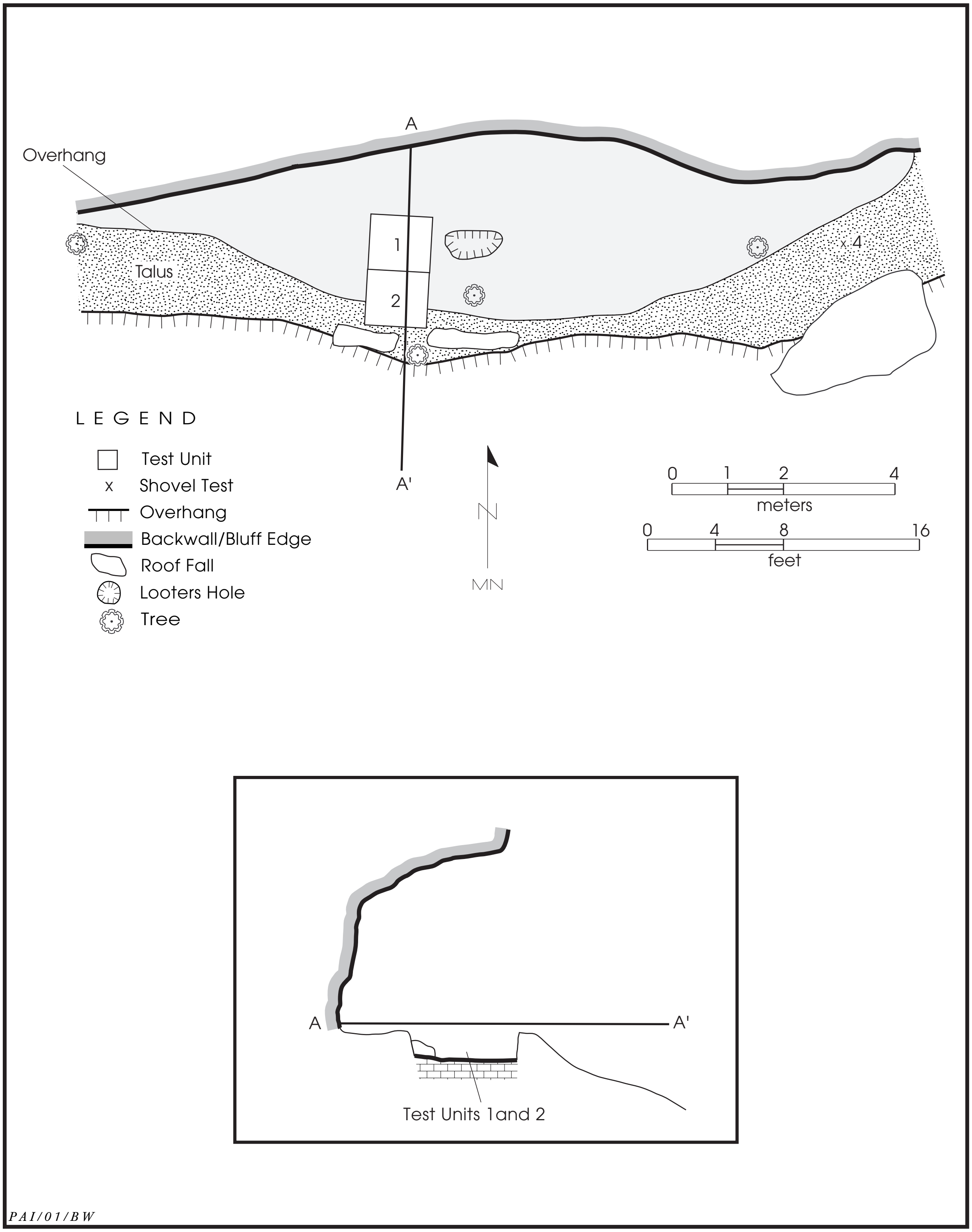

Figure 5.8. Plan and profile of Rockshelter 1, 41BL488-A.

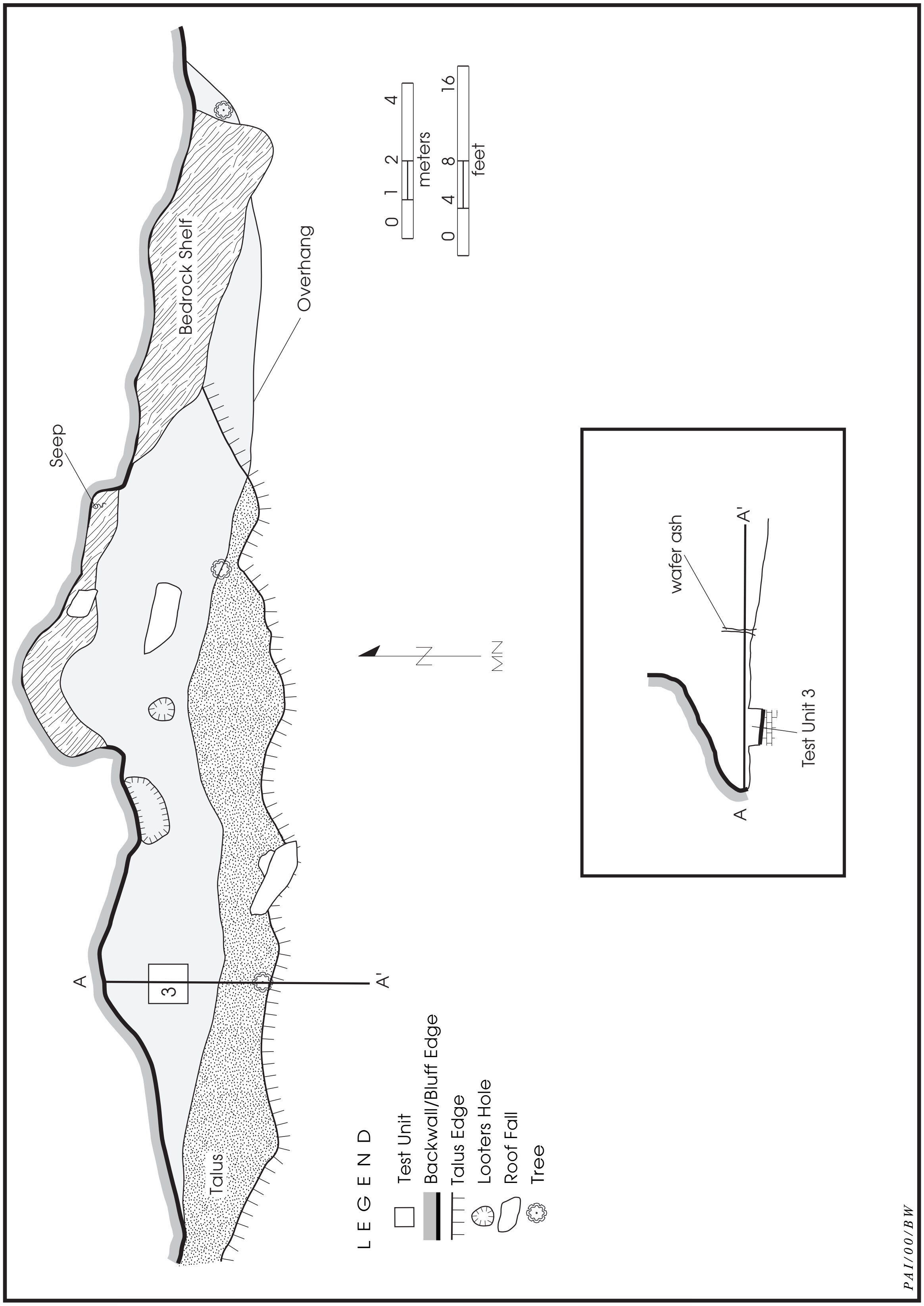

Figure 5.9. Plan and profile of Rockshelter 2, 41BL488-A.

Table 5.5. Summary of cultural materials from 41BL488-A, Test Units 1–3 and Shovel Test 4

Provenience	Arrow Points	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Miscellaneous Biface	Edge-modified Flakes	Unmodified Debitage	Modified Mussel Shells	Modified Marine Shell	Modified Shell (Unidentified)	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1														
Level 1 (0–10 cm)	1	–	–	–	1	75	–	–	–	77	–	–	19	4.00
Level 2 (10–20 cm)	1	1	1	–	1	86	–	–	1	91	–	1	18	4.00
Level 3 (20–30 cm)	–	–	–	–	1	10	–	–	–	11	–	–	5	1.00
Level 4 (30–40 cm)	–	–	–	–	–	1	–	–	–	1	–	–	2	0.10
Level 6 (50–60 cm)	–	–	–	–	–	3	–	–	–	3	–	–	–	–
Subtotals	2	1	1	0	3	175	0	0	1	183	0	1	44	9.10
TEST UNIT 2														
Level 1 (0–10 cm)	–	–	–	–	–	28	–	–	–	28	–	3	1	0.20
Level 2 (10–20 cm)	–	–	–	–	1	121	–	–	–	122	–	–	36	7.50
Level 3 (20–30 cm)	–	–	–	–	–	34	–	–	–	34	–	–	5	0.50
Level 4 (30–40 cm)	–	–	–	–	–	4	–	–	–	4	–	–	–	–
Level 5 (40–50 cm)	–	–	–	–	–	4	–	–	–	4	–	–	2	0.10
Subtotals	0	0	0	0	1	191	0	0	0	192	0	3	44	8.30
TEST UNIT 3														
Level 1 (0–10 cm)	–	1	–	–	2	161	1	–	–	165	2	13	19	1.50
Level 2 (10–20 cm)	–	–	1	1	2	124	–	1	–	129	7	10	35	2.75
Level 3 (20–30 cm)	–	–	–	–	1	14	1	–	–	16	1	–	15	5.00
Subtotals	0	1	1	1	5	299	2	1	0	310	10	23	69	9.25
SHOVEL TEST 4														
Level 1 (0–10 cm)	–	–	–	–	1	2	–	–	–	3	–	–	–	–
Level 2 (10–20 cm)	–	–	–	–	–	2	–	–	–	2	–	–	–	–
Subtotals	0	0	0	0	1	4	0	0	0	5	0	0	0	0.00
Totals	2	2	2	1	10	669	2	1	1	690	10	27	157	26.65

correspond to Abbott's (1995b:835) Type 3 sediments derived primarily from external sources (i.e., washed in from above). Underlain by bedrock, Test Unit 1 exposed a 52-cm-thick black silt loam A horizon with weak fine to very fine subangular blocky structure and many subangular limestone cobbles.

The 36-cm-thick profile of Test Unit 3 consists of gravelly silty clay loam over bedrock. The A horizon (0–3 cm) is a very dark grayish brown gravelly silty clay loam with a weak fine subangular blocky structure. This deposit does not appear to have been disturbed by recent flooding evident along the unnamed tributary. The underlying AC horizon (3–36 cm) comprises a black gravelly silty loam with common subangular limestone cobbles.

Cultural Materials

Excavation of the three test units and one shovel test yielded 690 artifacts, along with unmodified bones, mussel shells, and burned rocks, in the upper 60 cm of deposits (Table 5.5). Excavation of all three units was terminated when culturally sterile deposits were encountered. Most cultural materials were found in the upper 30 cm.

In Test Unit 1, evidence of looting activity was observed, and the upper 10 cm represents a disturbed spoil pile. Temporally diagnostic artifacts from this unit include a Scallorn arrow point and an untypeable serrated arrow point. A single modified shell is a complete, disk-shaped bead with a diameter of 9.4 mm. The perforation through the center of the bead has a diameter of 2.1 mm, and the hole was drilled from both sides. Although the nacre is visible on one side of the bead, the shell cannot be identified, and it could be freshwater mussel or marine shell. Hall (1981:211) describes and illustrates a similar marine-shell disk bead from Allens Creek in Austin County. Charcoal collected at 16 cm is identified as *Quercus* sp. wood and yielded a conventional radiocarbon age of 960 ± 40 B.P. (Beta-149101).

In Test Unit 2, extensive root disturbance was observed, but many of the displaced burned rocks in Level 2 may represent a feature. No unusual artifacts were found in this unit.

Test Unit 3 yielded more artifacts than the other two units. Vertebrate faunal remains were found only in Test Unit 3, and six bones exhibit evidence of burning, and three are spirally fractured. Charcoal collected at 10–20 cm was identified as *Juniperus* sp. wood and yielded a conventional radiocarbon age of 1240 ± 40 B.P. (Beta-149102). This unit also yielded one cut *Quadrula* sp. mussel shell and a fragment of a tubular-shaped marine-shell bead. The latter is made from the columella (central column) portion of a large spiral gastropod shell such as the conch or whelk shells found along the Texas coast. The bead measures 32.3 mm long and is biconically perforated. The drill holes are larger at both ends and taper to points toward the center of the bead. The perforations are estimated to be 4 mm in diameter. The exterior surface, including the ends, have been ground and smoothed. This columella shell bead matches the Form 1 beads Hall (1981:208) described and illustrated.

Discussion

Although there is evidence of looting in the rockshelter, testing results reveal that intact cultural deposits are shallowly buried in dark, weakly developed soils. Peaks in cultural materials occur from the surface to 20 cm, and charred juniper and oak wood yielded calibrated radiocarbon dates (2-sigma range) of A.D. 680–890 and A.D. 1000–1180, respectively. These chronometric data, along with a Scallorn arrow point, indicate that the rockshelter was occupied during the Late Archaic to Late Prehistoric period transition.

The lithic assemblage comprises 686 artifacts consisting of 17 tools and 669 pieces of debitage. Minimally modified flake tools and fragmentary bifaces dominate the tool assemblage. Most of the debitage is noncortical flaking debris (n = 598, 89.4 percent), suggesting that cores as well as bifacial and flake blanks were transported to the site. Also, a large percentage (n = 519, 77.6 percent) of the debitage is less than ½ inch in size, suggesting that much of the reduction was focused on late-stage tool production. A qualitative examination of platform remnants revealed many lipped and faceted platforms diagnostic of late-stage soft-hammer biface thinning. A few small, parallel-sided flakes with small, lipped platforms were also noted. These flakes are consistent with those produced by pressure flaking, also indicating late-stage tool production.

In terms of raw material acquisition, considerable diversity of chert types is represented in the assemblage. Of the known chert types at Fort Hood, Cowhouse White makes up the largest percentage (n = 142, 20.7 percent) of the lithic tools and debitage. This resource is situated within 1 km of the site. Chert types from the Heiner Lake area (i.e., Heiner Lake Blue, Tan, and Translucent Brown) are the next most commonly identified cherts (n = 85, 12.4 percent), followed by the North Fort Chert Province cherts (including Gray-Brown-Green, Fort Hood Yellow, Fort Hood Gray, and Owl Creek Black) (n = 26, 3.8 percent). Fossiliferous pale brown (n=1) and East Range Flecked (n=1) account for only 0.3 percent of the assemblage. The color and texture diversity within the cherts from indeterminate sources (n = 431, 62.8 percent) probably represent various bedrock and upland lag-gravel sources and bedload cherts from the Leon River or Cowhouse Creek. A qualitative examination of cortex reveals rough and relatively unweathered as well as highly polished cortex, suggesting raw material acquisition from both upland lag-gravel and stream bedload sources.

Although no discrete features were encountered, cultural materials recovered from 41BL488-A indicate a suite of activities including hunting, cooking, production of decorative items, and gathering and processing of plant resources (based on the previous recovery of ground-stone tools). Five of 10 bones are from canid- to deer-sized mammals, and 2 of these are spirally fractured. Six bones exhibit evidence of burning. Eleven mussel shells are identified as *Amblema plicata*, *Potamilus purpuratus*, and *Quadrula houstonensis*, and the rest (n = 16) are unidentifiable. Cut mussel shells are evidence of local manufacture of ornamental goods. The columella shell bead represents an item imported from the Gulf coast. Marine-shell artifacts and associated Scallorn arrow points have been recovered from several central Texas sites containing burials, including 41BL3, a Fort Hood rockshelter A. T. Jackson excavated in 1933 (Jackson 1933; Prewitt 1982:45–57). Hall (1981:214–222) notes that ornaments made from Texas coastal marine shells were an important component of the exchange network between south Texas or coastal groups and central Texas peoples during late Archaic times. Site 41BL488-A may now be added to the list of central Texas sites yielding marine shell artifacts (see Hall 1981:Table 8 and Figure 49). Although tenuously, the occurrence of a marine shell bead, commonly associated with graves in central and south Texas, suggests that human burials may be present. Based on the testing results, 41BL488-A is recommended as eligible for listing in the National Register.

41BL490

Site Setting

Site 41BL490 consists of a north-northeast-facing rockshelter located 150 m west of the head of a deeply incised tributary of Bull Branch. In front of the shelter, dense vegetation includes chinquapin oak, hackberry, Texas ash, Carolina buckthorn, Virginia creeper, poison ivy, and maidenhair fern. Site elevation is 225 m above mean sea level.

Previous Work

Moore and Ensor (Texas A&M University) first recorded the site on 14 December 1983 (Carlson et al. 1986:132–133). The rockshelter measured 30x9 m, with charcoal, bones, mussel shells, flakes, bifaces, and burned rocks noted. The depth of the deposit was unknown, but bedrock was exposed at the back of the shelter. Erosion affected an estimated 5 percent of the rockshelter.

On 3 March 1993, Abbott and Kleinbach (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A224–A225). The site size was expanded to 34x16 m to encompass the rockshelter and associated talus slope, and the rockshelter measured 30x8x2 m. The rockshelter was situated directly beneath the escarpment edge (Manning surface). The back half of the shelter consisted of several low limestone and travertine benches lacking significant deposits. Sediment was concentrated in the front portion of the shelter and consisted of a mixed melange of light brown, light orange, red, pinkish brown, and white stony silt loam. A short, steep talus that sloped approximately 7 m to the tributary fronted the shelter. Researchers observed that intensive looting had disturbed at least 95 percent of the shelter deposits. A low density of flakes, burned rocks, bones, mussel shells, and charcoal were scattered throughout the shelter, and a Darl dart point was collected from a backdirt pile. The only potential for intact deposits was beneath large pieces of roof fall in the east end of the shelter. In addition to looting, sheet erosion and bioturbation disturbances were noted. Although no shovel testing was recommended, a portion of the rockshelter had the potential to contain intact archeological deposits. Recommended testing to determine National Register eligibility consisted of a minimum of 1 m^2 of manually excavated test units (Trierweiler, ed. 1994:A224).

Work Performed

On 15 May 2000, formal testing of 41BL490 was completed (Figure 5.10). As noted in 1993, looting had extensively disturbed the deposits in the rockshelter. The excavations consisted of two contiguous 1x1-m test units (Test Units 1 and 2) and one shovel test (Shovel Test 1); a total of 1.1 m^3 were excavated from the test units.

Test Unit 1 was wedged between looter's holes in the east end of the shelter. Situated beneath the overhang, the excavation was 4.2 m north of the back wall and 1.1 m from the edge of the exposed travertine. The surface was slightly mounded and probably represented spoil from looting. Different matrices were present from 10 to 30 cm, and the weathered sediments were excavated and screened separately from the travertine deposits. Only travertine was present from 30 to 69 cm. The test unit excavation was terminated on bedrock between 60 and 69 cm.

Immediately northeast of Test Unit 1, Test Unit 2 was located beneath the overhang, and placed between a looter's hole and a large roof-fall boulder. The excavation was arbitrarily terminated when travertine deposits were encountered at 50 cm.

Shovel Test 1 was situated in the western portion of the shelter where most of the floor consisted of exposed travertine. The maximum height of the overhang was 40 cm. Excavated to a maximum depth of 42 cm, the shovel test was terminated on travertine deposits that sloped slightly from south to north.

Site Extent and Depth

The site is defined as the entire rockshelter and the upper edge of the talus slope; it has maximum dimensions of 31.0x10.0x2.4 m. Based on the extent of disturbance and paucity of cultural materials in undisturbed contexts, no intact prehistoric cultural component is present.

Sediments and Stratigraphy

The deposits exposed in two test units correlate to Abbott's (1995b:833–837) internally derived Type 1 sediments (Abbott and Trierweiler, eds. 1995a) and are underlain by bedrock. The profile of Test Unit 1 reveals an AC horizon (0–47 cm) consisting of a light gray silty clay loam with a weak single grain structure and subangular limestone fragments of roof fall. The Cr horizon (47–68 cm) is light gray massive silty clay loam with common distinct fine yellow mottles representing a redox zone resulting from water discharge.

In Test Unit 2, the AC horizon (0–26 cm) is a grayish brown silty clay loam with weak very fine subangular blocky structure and common subangular limestone pebbles. The C horizon (26–51 cm) consists of a very pale brown silty clay loam with common distinct fine brownish yellow mottles and weak fine subangular blocky structure.

Cultural Materials

The artifact assemblage recovered from the test units consists of 24 unmodified flakes recovered from 20 to 30 cm below the surface (Table 5.6). Level 1 (0–10 cm) in Test Unit 1 was culturally sterile. Although silt and travertine deposits appeared in the southern part of the unit between 10 and 30 cm, only one flake was found. No cultural materials were found in the travertine deposits that covered the entire unit from 30 to 69 cm. A probable human bone found in Level 2 is a heavily weathered fragment. It was examined by Joan E. Baker (Texas A&M University), but a confident identification as human was not possible. It appears to be a fragment of articular facet (with the talus head) of a left navicular, a foot bone (cf. Steele and Bramblett 1988: Figure 11.5A).

Sparse cultural materials were present in Test Unit 2 from the surface to 20 cm. An amorphous stain consisting of black silt was encountered at 10–19 cm along the west wall and had maximum dimensions of 35 cm east-west by 32 cm north-south. It appeared to be

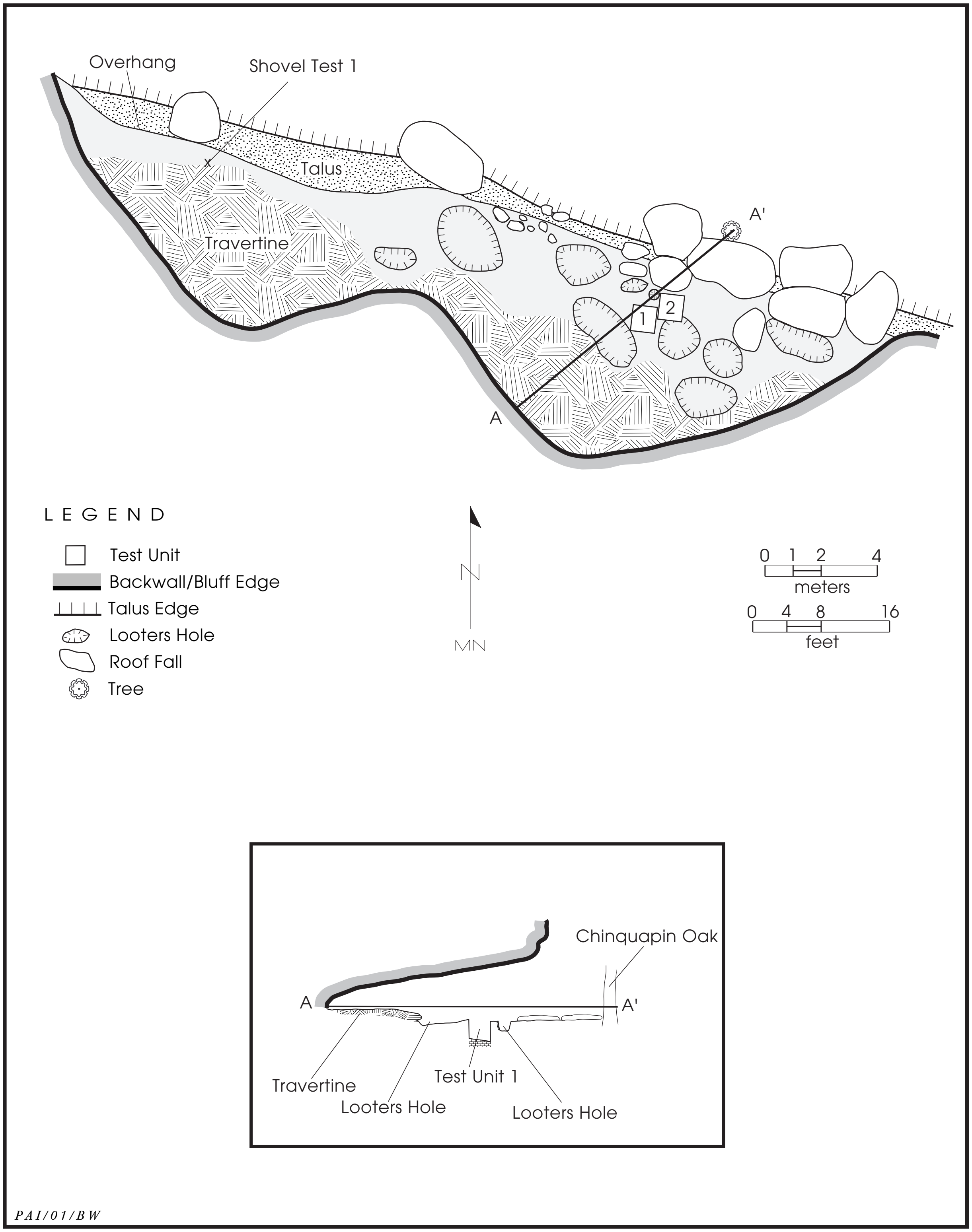

Figure 5.10. Plan and profile of 41BL490.

Table 5.6. Summary of cultural materials from 41BL490, Test Units 1 and 2

Provenience	Unmodified Debitage	Unmodified Bone	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1				
Level 2 (10–20 cm)*	3	–	2	0.50
Level 2 (10–20 cm)**	1	–	–	–
Level 3 (20–30 cm)	7	–	1	0.25
Subtotals	11	0	3	0.75
TEST UNIT 2				
Level 1 (0–10 cm)	10	–	1	0.10
Level 2 (10–20 cm)	1	1	2	0.10
Level 3 (20–30 cm)	2	–	–	–
Subtotals	13	1	3	0.20
Totals	24	1	6	0.95

* A probable human bone was found in this level.
** Travertine deposits.

discolored from charcoal and decayed roots, had an irregular bottom, and was underlain by travertine. This stained sediment was collected because is was though to represent a possible cultural feature, and flotation of the sample produced *Celtis* and *Quercus* spp. wood, *Carya* sp. nut shells, and *Phragmites communis* (cane) stem fragments. At 20–30 cm, the excavation was predominantly travertine, with small, loose pockets of a dark, silty fill among several roots; two flakes were recovered from the darker sediment. The travertine deposits from 30–50 cm were culturally sterile.

Discussion

As noted in 1993, looting that occurred between 1983 and 1993 destroyed most of the rockshelter deposits at 41BL490. Sparse cultural materials were found in the current excavations, and, as could be expected considering the severity of looting, only a minimal amount of cultural materials was observed in the rockshelter. A probable human bone fragment recovered from Test Unit 1 is from a disturbed context, as the presence of modern cloth in the same level shows. The discovery of a probable human element and the extent of looting activities do, however, suggest that the shelter once contained intact burials.

Charred macrobotanical remains of oak and hackberry wood, hickory nut shells, and cane-stem fragments were recovered from a shallowly buried, irregular stain. It is unclear what this area represents other than burning of these organic materials. Although this is the first site at Fort Hood to yield common cane, an important aboriginal resource, no intact living surface is apparent, and no artifacts are associated.

As was observed in 1993, the only potential for undisturbed deposits was beneath large roof fall blocks along the talus edge at the east end of the shelter in an area measuring 6 m east-west by 1 m north-south. Looter's holes beside the limestone blocks have partially undermined the deposits here, and these exposures, along with the test excavations, suggest that this area has limited archeological potential. Based on surface manifestations and the excavation results, approximately half of the shelter consists of travertine deposits at least 40 cm thick. Although the travertine does not contain archeological materials, this extensive deposit has the potential to yield significant paleoenvironmental data. Nonetheless, the excavation results and extent of looting indicate that 41BL490 has limited archeological research potential, and the site is recommended as not eligible for listing in the National Register.

41BL491

Site Setting

Site 41BL491 is a north-facing rockshelter situated approximately 140 m east of the head of a deeply incised tributary of Bull Branch. Vegetation in front of the rockshelter consists of Texas ash, cedar elm, chinquapin oak, persimmon, Mexican buckeye, Carolina buckthorn, maidenhair fern, and beauty berry. Site elevation is 225 m above mean sea level.

Previous Work

Gray, Bradle, and Meiszner (Texas A&M University) first recorded the site on 14 December 1983 (Carlson et al. 1986:133). The site, measuring 35x35 m, consisted of a rockshelter and the slope down to the tributary. A few flakes, mussel shells, bones (possibly recent), and a core were observed on the shelter floor, but no cultural materials were noted on the talus slope. The depth of deposits in the shelter was at least 20 cm, and erosion and a possible pothole affected an estimated 6 percent of the rockshelter.

On 3 March 1993, Abbott and Kleinbach (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A226–A230). Encompassing the rockshelter and a portion of the steep talus slope, the site size was modified to 40x5 m. The maximum height of the overhang was 2.5 m. The rockshelter was situated directly beneath the upland (Manning) surface. At the east end of the shelter, several very large boulders calved off the escarpment face had blocked access to a low cavity where the roof height was less than 40 cm. A number of large roof-fall boulders also littered the intervening slope, representing the collapse of the shelter roof. The shelter fill consisted of a highly organic, very stony gray-brown loam that was limited to the eastern two-thirds of the shelter. Looter's holes revealed that the sediment was approximately 25 cm thick and lacked obvious stratification. The same cultural materials (including recent bone) noted in 1983 were observed within the shelter and on the talus edge. Looting, bioturbation, and sheet erosion had disturbed 50–70 percent of the site. Because the site had the potential to contain intact cultural deposits, shovel testing was warranted.

On 30 March 1993, a crew excavated one shovel test and one 50x50-cm test quad. The shovel test was located near the back wall of the shelter. Ending on bedrock at 20 cm, the shovel test yielded 25 flakes at 10–20 cm. Excavated to 50 cm about 2 m northwest of the shovel test, the test quad produced 140 flakes, 1 untyped dart point, 1 biface, 1 edge-modified flake, 4 burned rocks, and a few mussel shell fragments. Most of the cultural materials occurred in the upper 30 cm of deposits. Bedrock, gently sloping from west to east, was encountered between 48 and 55 cm. Based on these results, the rockshelter had the potential to contain intact archeological deposits. Recommended testing to determine National Register eligibility consisted of a minimum of 2 m^2 of manually excavated test units (Trierweiler, ed. 1994:A226).

Work Performed

On 10 May 2000, formal testing of 41BL491 was completed (Figure 5.11). The site was restricted to the rockshelter and a small portion of the upper edge of the talus slope. One large (1x2 m) and a few smaller, shallow potholes were observed within the overhang. The only excavation was Test Unit 1, which was situated completely beneath the overhang and just east-northeast of a looter's hole. The test unit was terminated between 33 and 47 cm when bedrock and roof fall rocks were encountered.

Site Extent and Depth

The rockshelter has maximum dimensions of 39.5x8.6 m. Cultural materials were present to a depth of 47 cm, with a peak in artifacts occurring at 20–30 cm.

Sediments and Stratigraphy

The profile of Test Unit 1 consists of limestone roof-fall fragments in a very dark gray silty clay loam matrix underlain by bedrock. The matrix also contains common fine, soft carbonate masses, and correlates to Abbott's (1995b:833–837) Type 3 sediments, derived from external sources (i.e., washed in from above).

Cultural Materials

A total of 343 artifacts were recovered from Test Unit 1 (Table 5.7). The upper 10 cm of deposits in Test Unit 1 appeared to be spoil from the looter's hole. The test unit yielded stone artifacts, vertebrate and invertebrate remains, and burned rocks at 10–40 cm; most of these cultural materials, including an untypeable dart point, occurred at 20–30 cm. Charcoal collected at 20–30 cm was identified as *Juniperus* sp. wood and yielded a conventional radiocarbon age of 1320 ± 40 B.P. (Beta-149103). Sparse cultural materials were found from 40 to 47 cm. Flotation of sediment samples collected adjacent to the north wall at 30–40 cm and 40–47 cm yielded *Juniperus* and *Quercus* spp. wood, along with *Carya* sp. nut shells.

Discussion

Although portions of the shelter floor were damaged by looting, a sizable portion of the interior surface does not appear to be disturbed. The excavation reveals that a discrete cultural component, represented by a 10-cm-thick lens

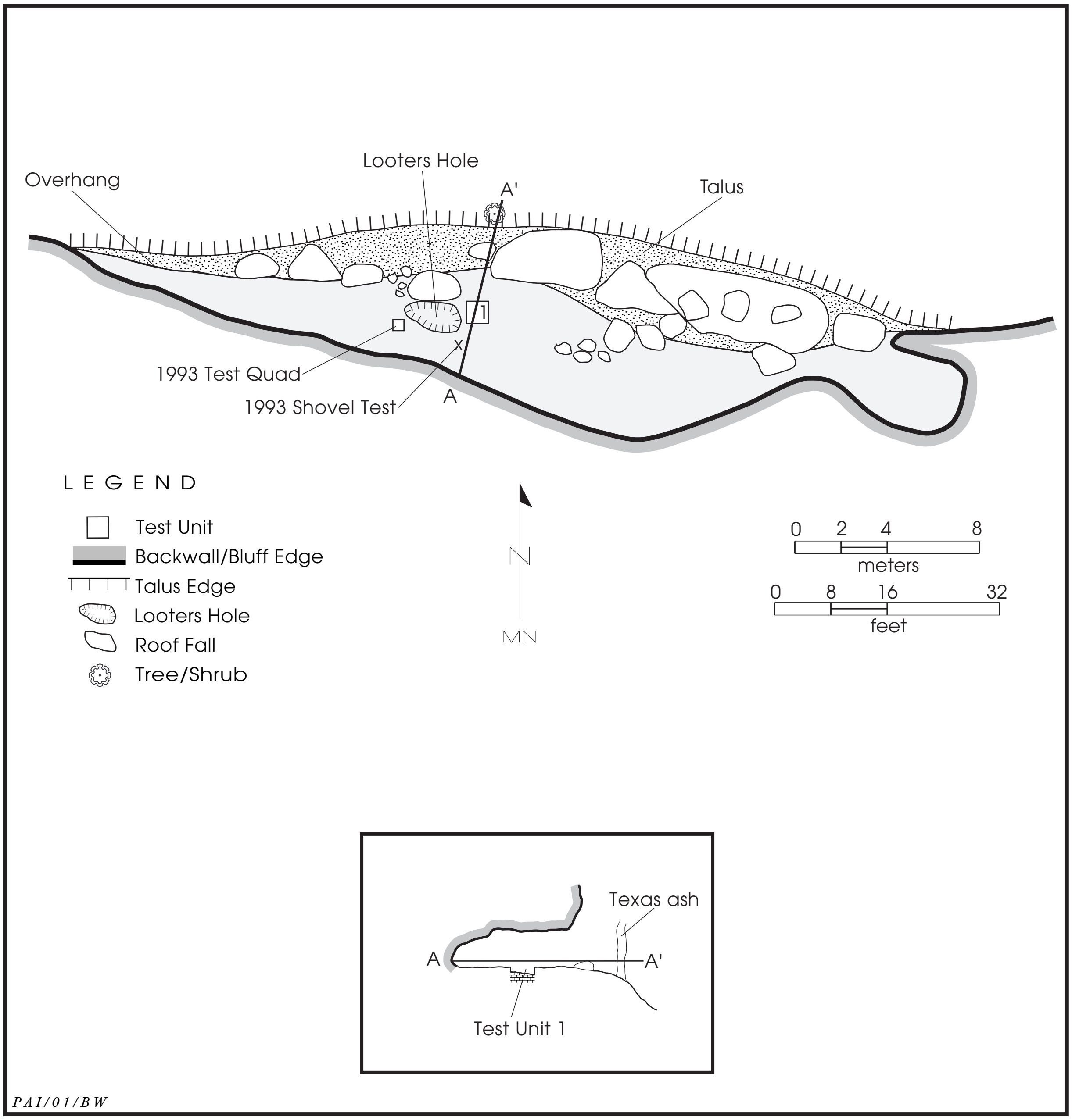

Figure 5.11 Plan and profile of 41BL491.

of cultural materials, is shallowly buried at 20–30 cm. A calibrated radiocarbon date (2-sigma range) of A.D. 650–780 indicates that this cultural zone correlates to the Late Archaic to Late Prehistoric transition period. Floral and faunal materials preserved in the shelter deposits are identified as oak and juniper wood (fuel), along with hickory shell fragments and mussel shells (food resources).

The lithic assemblage consists of 4 tools and 339 pieces of debitage. Most of the debitage consists of noncortical flaking debris (n = 313, 92.3 percent), supporting the premise that flake blanks with little or no cortex, as well as middle- to late-stage bifaces, were brought to the site. Also, 82.6 percent (n = 280) of the debitage is less than 1/4 inch in size, suggesting that much of the reduction was focused on late-stage tool

Table 5.7. Cultural materials from 41BL491, Test Unit 1

Provenience	Dart Point	Late-stage to Finished Bifaces	Miscellaneous Uniface	Unmodified Debitage	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 1 (0–10 cm)	–	–	–	2	2	–	–	–	–
Level 2 (10–20 cm)	–	1	–	53	54	–	3	5	0.50
Level 3 (20–30 cm)	1	1	1	233	236	–	3	18	2.50
Level 4 (30–40 cm)	–	–	–	49	49	–	1	16	1.00
Level 5 (40–47 cm)	–	–	–	2	2	4	–	6	0.75
Totals	1	2	1	339	343	4	7	45	4.75

production. A qualitative examination of debitage platform remnants reveals many lipped and faceted platforms diagnostic of late-stage soft-hammer biface thinning. Many small parallel-sided flakes with small, lipped platforms are also noted. These flakes are consistent with those produced by pressure flaking, which supports the interpretation of late-stage tool production.

Of the known chert types at Fort Hood, the Heiner Lake group is the most commonly identified at the site (n = 68, 19.8 percent). Chert types from the North Fort Province are the second most abundant (n = 28, 8.2 percent). This contrasts to other rockshelters (e.g., 41BL43 and 41BL488-A) in the area where Cowhouse White is the most commonly identified (and nearest) chert type, followed by the North Fort Province and Heiner Lake varieties. The color and texture diversities within the cherts from indeterminate sources (n = 212, 61.8 percent) likely represent variability within known bedrock and lag-gravel sources and bedload cherts from the Leon River or Cowhouse Creek. A qualitative examination of cortex reveals the presence of rough and relatively unweathered as well as highly polished cortex, suggesting raw material acquisition from both upland lag-gravel and stream bedload sources.

Based on the testing results, 41BL491 contains a buried cultural component with well-preserved floral and faunal remains. Despite some looting damage, a significant amount of Late Archaic to Late Prehistoric deposits remain intact, and the site is recommended as eligible for listing in the National Register.

41BL589-B

Site Setting

Situated at the head of an unnamed tributary of Bull Branch, 41BL589 subsumes a rockshelter and the adjacent upland surface north and east of the drainage (Figure 5.12). The upland supports a dense oak-juniper woodland with relatively few clearings. Seeps occur along the bedrock face north of the rockshelter, evidenced by the presence of travertine deposits. Along the talus edge and slope of the rockshelter the vegetation includes Texas red oak, juniper, Texas ash, poison ivy, cedar sage, and maidenhair fern. Site elevation is 210 m above mean sea level.

Previous Work

Moore and Ensor (Texas A&M University) first recorded the site on 6 March 1984 (Carlson et al. 1986:175). Measuring 180x100 m, it consisted of a lithic scatter with mussel shells and burned rocks around the head of a drainage and along the slope; the site also included one apparently unoccupied rockshelter. The lithic assemblage was comprised of dart points, bifaces, an end scraper (collected), flakes, and a chopper. A spring was noted just downstream from the site. Erosion had disturbed an estimated 5 percent of the site.

On 7 December 1992, Abbott and Mehalchick (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A327–A329). Based on differing archeological

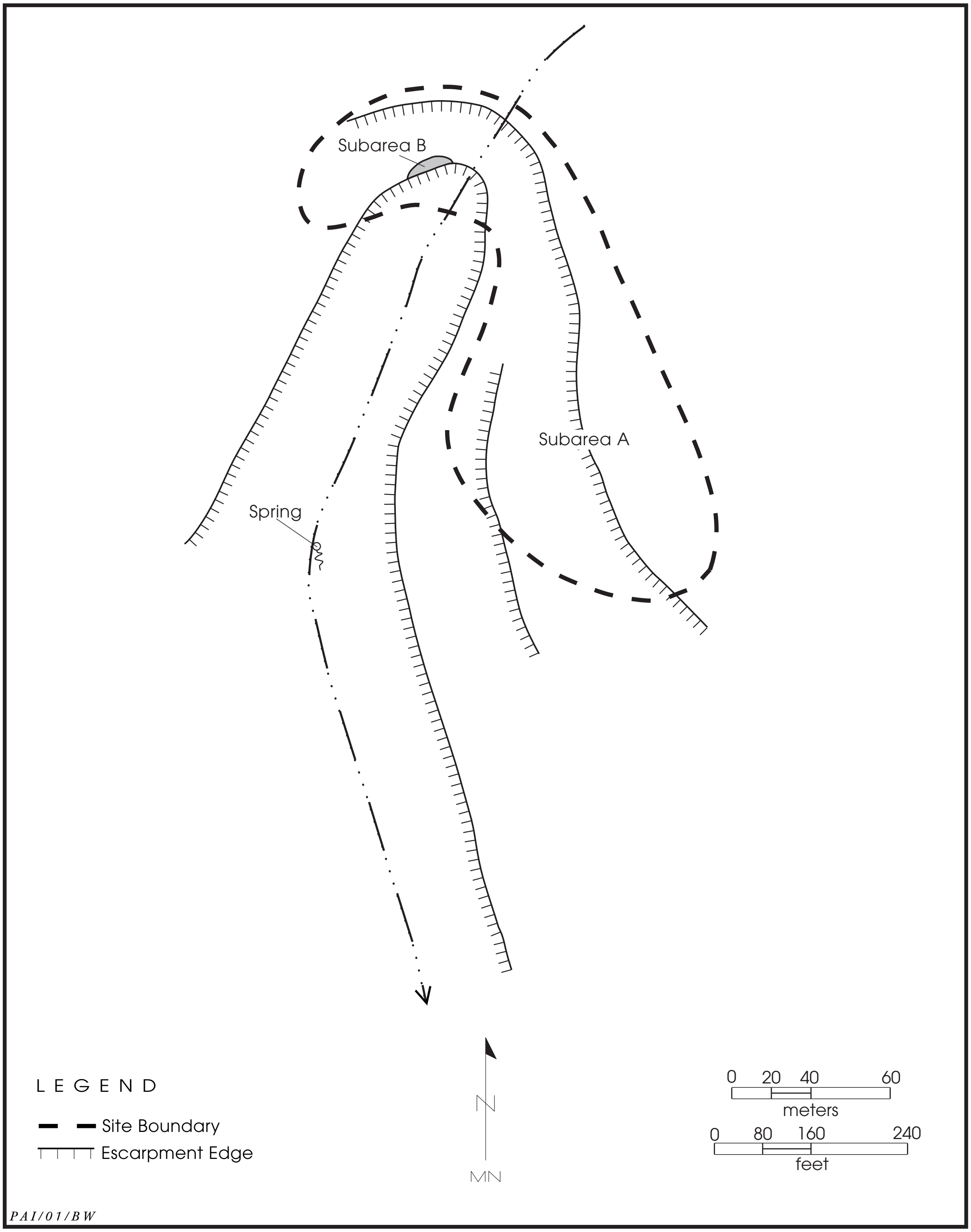

Figure 5.12. Site map of 41BL589 (modified from Trierweiler, ed. 1994:A328).

potentials and geomorphic contexts, the site was divided into Subareas A and B. Because of the extent of cultural materials, the site size was enlarged to 230x100 m.

Subarea A subsumed the stepped, sloping upland (Manning) surface surrounding the head of an unnamed tributary of Bull Branch. This surface was mantled with a thin, residual clay soil exhibiting an A-R profile. Mussel shells and debitage were scattered across the subarea, but most of these materials were observed on the east side of the drainage. Five to seven pockets, or concentrations of tertiary flakes, were found in various areas with moderate surface visibility. One Marcos dart point was collected. Because vegetation clearing and erosion had severely disturbed the area, the potential for intact cultural deposits was considered negligible, and no further work was recommended for Subarea A.

Subarea B consisted of a southeast-facing rockshelter situated at the head of a tributary that flows into a steeply dipping valley. The shelter measured ca. 15.0x1.5x1.8 m; the fill consisted of abundant angular limestone fragments intermixed with a very dark reddish brown clay loam derived from erosion of the upland soil. The estimated depth of the shelter deposits was 10–25 cm. No cultural materials were observed, but leaf litter and limestone spalls rendered visibility very poor. The shelter lacked any visible signs of vandalism and was minimally disturbed by animals and erosion. Because there was potential for buried cultural deposits, shovel testing was warranted.

On 21 December 1992, a crew excavated one 50x50-cm test quad. The test quad was placed near the back wall at the west end of the shelter. Bedrock was encountered at 23–30 cm, and only one flake was recovered at 20–30 cm. The matrix contained many burned rocks, and charcoal was noted in each level. Based on these results, Subarea B had the potential to contain intact archeological deposits. Recommended testing to determine National Register eligibility consisted of a minimum of 2–3 m^2 of manually excavated test units (Trierweiler, ed. 1994:A328–A329).

Work Performed

Before excavation, the rockshelter comprising Subarea B was re-inspected. Its dimensions were modified to 9.25x3.50x1.80 m, primarily because a scale on the 1992 map was incorrect. A bedrock shelf, ca. 1.25–1.50 m wide, was exposed along the back wall the entire length of the rockshelter. No evidence of looting was apparent, but access to the site is easy because a good two-track road leads to a well-maintained deer blind located approximately 100 m from the rockshelter.

On 16 May 2000, formal testing of 41BL589-B was completed (Figure 5.13). A total of 0.35 m^3 was manually excavated from one 1x1-m test unit (Test Unit 1). Aligned to 40°, Test Unit 1 was placed about 2 m from the back wall of the shelter and near the edge of the bedrock shelf. The unit straddled the dripline, with southeastern end of the unit beyond the edge of the overhang. Bedrock, sloping from west to east across the unit, was encountered between 27 and 39 cm.

Site Extent and Depth

The rockshelter has maximum dimensions of 9.25x3.50x1.80 m and shows very little roof fall across the floor. One intact prehistoric component is represented by a burned rock feature and associated cultural remains in the 40-cm-thick deposits.

Sediments and Stratigraphy

The profile of Test Unit 1 exhibits very dark brown loamy sediments with a layer of leaf litter and organic material underlain by bedrock. The Oi horizon (0–6 cm) is a very dark brown loam with weak fine subangular blocky parting to coarse granular structure and common partially decomposed organic material. At 6–45 cm, the underlying AC horizon is very dark brown loam with common subangular limestone cobbles. This deposit corresponds to Abbott's (1995b:833–837) Type 3 externally derived sediments, and it is likely that flooding has contributed to the shelter fill.

Cultural Materials

In Test Unit 1, cultural materials were continuous to a maximum depth of 39 cm (Table 5.8). The excavation produced six stone tools including a Scallorn arrow point, as well as flakes, spirally fractured and burned Mammalia bone fragments, unmodified mussel shells, and burned rocks (2.7 kg). Almost 75 percent

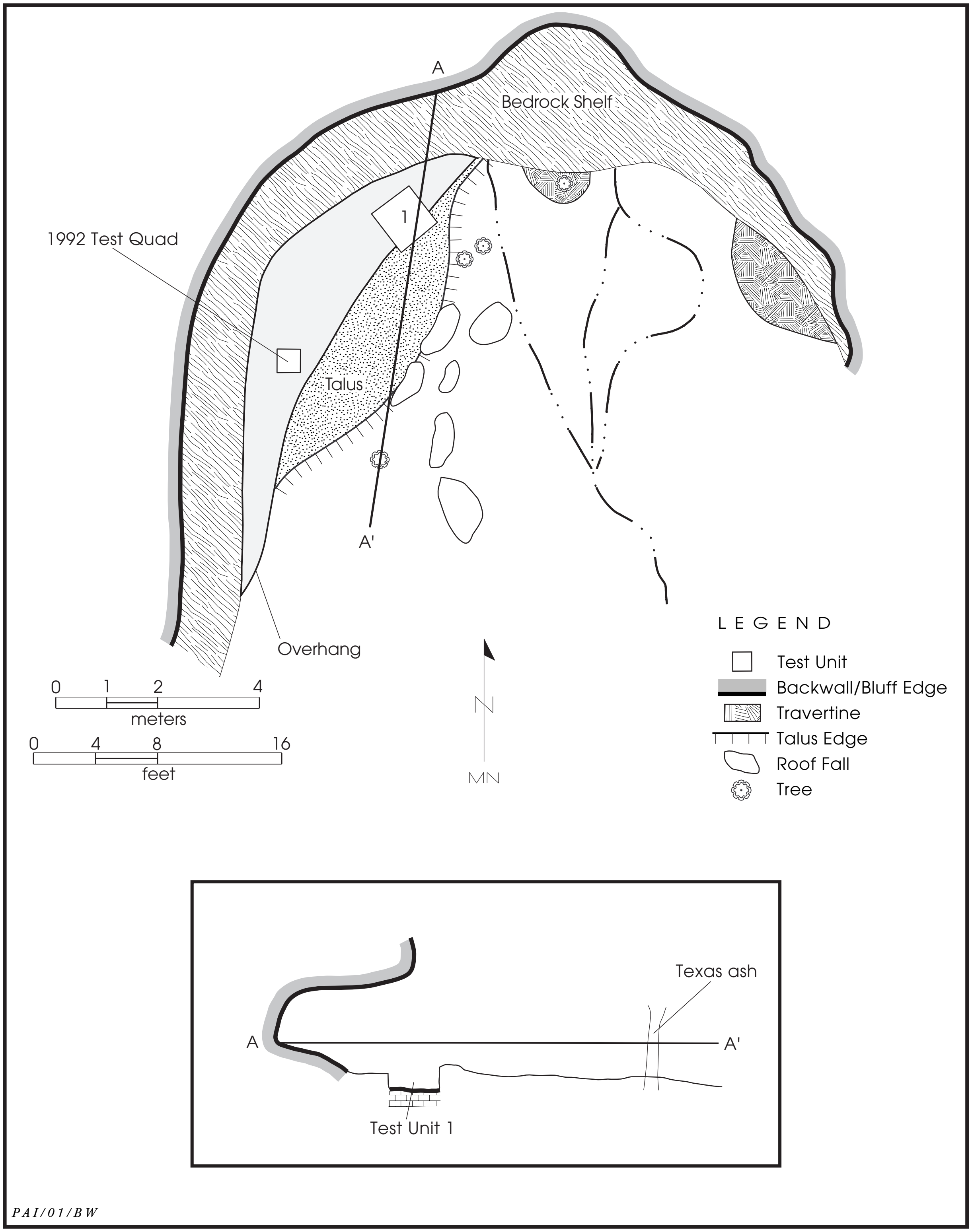

Figure 5.13. Plan and profile of 41BL589-B.

Table 5.8. Summary of cultural materials from 41BL589-B, Test Unit 1

Provenience	Arrow Points	End-Side Scraper	Spokeshave	Edge-modified Flake	Unmodified Debitage	Total Artifacts	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 1 (0–10 cm)	–	–	–	–	3	3	–	–	2	0.10
Level 2 (10–20 cm)	–	–	–	–	23	23	–	4	18	1.50
Feature 1 (19–31 cm)	2	–	–	1	19	22	–	–	29	9.00
Level 3 (20–30 cm)	1	1	1	–	161	264	3	13	13	1.00
Level 4 (30–39 cm)	–	–	–	–	15	15	–	–	1	0.10
Totals	3	1	1	1	221	227	3	17	63	11.70

(n = 193) of these materials occurred at 20–30 cm in the matrix around Feature 1, a burned rock concentration (see Cultural Features).

Cultural Features

Feature 1 was a burned rock concentration from 19 to 31 cm in the southeast quadrant of the unit. The feature had maximum excavated dimensions of 61 cm east-west by 44 cm north-south. The western edge of the feature abutted large, unburned limestone spalls, and smaller spalls intermixed with the burned rocks. Feature 1 consisted of one to two layers of partially imbricated burned rocks (n = 29, 9 kg). Half of the burned rocks were thin tabular pieces (up to 10x5x3 cm), but there were a few slabs (measuring 20x10x5 cm) present. The rest were fist-sized and smaller angular fragments. Approximately one-third of the rocks were burned on top only, and most were lying flat. A few pieces of fossiliferous limestone were noted. Because the feature extended north and east beyond the edge of the test unit, its overall size could not be estimated. Although the feature's function is unclear, it may have been the edge of a hearth or part of a buried living surface or occupation zone. Artifacts recovered from the feature consisted of a Scallorn arrow point, an untypeable arrow point fragment, an edge-modified flake, and debitage. Charred *Quercus* sp. wood collected at 26 cm yielded a conventional radiocarbon age of 1080 ± 40 B.P. (Beta-149104). One flotation sample of feature fill yielded *Quercus* sp. wood and *Carya* sp. nut.

Discussion

The test unit within the shelter encountered a discrete concentration of burned rocks (Feature 1) and a concurrent peak in cultural materials from the surrounding matrix. This cultural occupation is shallowly buried in relatively thin deposits that show no evidence of disturbance. A calibrated radiocarbon date (2-sigma range) of A.D. 890–1020 on charred oak wood from Feature 1, as well as Scallorn arrow points found in and near the burned rock concentration, indicate that the shelter was occupied during the Austin phase of the Late Prehistoric period. Charred hickory nut fragments and mussel shells represent food resources.

Six tools and 221 flakes were recovered from the site. Except for the 3 arrow points, the tools appear to have a similar scraping function, based on macrowear, morphology, and edge angle. Debitage largely consists of noncortical flakes (n = 166, 75.1 percent). Although flakes less than 1/2 inch in size are the most common (n = 172, 77.8 percent), a number of large flakes (<1.5 inches) are present (n = 8, 3.6 percent). A qualitative examination of platform remnants reveals that most flakes greater than 1.5 inches exhibit large, single-facet platforms, suggesting flake extraction from a core. In the smaller size grades (<1 inch), the many lipped and faceted platforms are diagnostic of late-stage soft-hammer biface thinning. All of these observations suggest a diversity of lithic reduction activities were taking place, including flake production from cores and middle- to late-stage biface production.

Two named chert types dominate the lithic assemblage. Cowhouse White (n = 21, 9.3 percent) is the most commonly identified chert type, followed by Heiner Lake Blue (n = 15, 6.6 percent). The sample also includes Heiner Lake Tan and cherts from the North Fort Province, but in very limited numbers as compared to other rockshelters (41BL43, 41BL488-A, and 41BL491) in the area. The color and texture diversities within the cherts from indeterminate sources (n = 177, 78 percent) likely represent variability within known bedrock and lag-gravel sources and bedload cherts from the Leon River or Cowhouse Creek. A qualitative examination of cortex reveals the presence of rough and relatively unweathered as well as highly polished cortex, suggesting raw material acquisition from both upland lag-gravel and stream bedload sources.

Based on testing results, 41BL589-B contains a discrete buried cultural component that has preserved organic remains and an assemblage of temporally and functionally diagnostic artifacts. Although the cultural deposits are thin (generally less that 30 cm), they are intact, and this site is recommended as eligible for listing in the National Register.

41BL989-B

Site Setting

Site 41BL989 is located on a series of terraces east of Highway 190 (Central Texas Expressway) and south of Business Highway 190 (Veterans Memorial Boulevard). South Nolan Creek delimits the southern site boundary and an east-west two-track road parallels the drainage. Most of the area supports grasses and isolated junipers, with a mixed riparian tree line adjoining the creek. Site elevation is 260 m above mean sea level.

Previous Work

Stocker (Texas A&M University) recorded the site on 2 December 1991 (Thoms 1993:92–93). The site was defined as a lithic scatter consisting of bifaces, flakes, cores, and sparse burned rocks. One possible Plainview point was collected. Vegetation cover was heavy in most areas, but cultural materials were exposed along two-track roads. Maximum site dimensions were 145x90 m, and roads, erosion, and a borrow pit disturbed an estimated 7 percent of the area.

At the request of Blanton & Associates, Inc., Anthony and Brown Consulting conducted a cultural resource survey of the proposed City of Killeen Southwest Interceptor (a wastewater pipeline) on 4–6 December 1997; a draft report was completed in January 1998. Although located in the vicinity of the proposed pipeline, 41BL989 was not situated within the construction right of way. One backhoe trench, placed near the proposed right of way and in the vicinity of 41BL989, "revealed no cultural materials and shows a shallow, eroded, disturbed soil profile." The researchers stated, "There is little likelihood that construction activities would stray as far north as the site, but in any case, because this site has not been fully evaluated under National Register criteria, it is worth stating that construction activities should be confined to the right of way in the area of this potentially significant site" (Anthony and Brown 1998:33).

In April 2000, Kleinbach (Fort Hood Cultural Resources Management Office) visited the site to differentiate depositional areas with archeological potential (personnel communication 2000). After this visit, formal testing to determine National Register eligibility was recommended. The recommended work consisted of six backhoe trenches and 2 m^2 of manually excavated test units.

Work Performed

Geomorphic Reconnaissance

Mehalchick and Kibler (Prewitt and Associates) visited and evaluated the site on 10 October 2000. Because archeological potentials and geomorphic contexts differed, the site was divided into Subareas A and B. The maximum site dimensions, 145x90 m, were not changed from the original 1991 recording.

Subarea A encompasses the higher terrace (T_2) that rests 3–4 m above the South Nolan Creek channel. The surface is extensively eroded and undulating and is disturbed by vegetation clearing, agriculture, an east-west two-track road, and a borrow pit. The southwest margin of the subarea adjoining the road has been disturbed by the City of Killeen Southwest

Interceptor. No subsurface exposures or profiles of the deposits below the T_2 surface were observed, but based on terrace elevation, these deposits are estimated to be late Pleistocene and tentatively correlated to the Jackson alluvium (Nordt 1992). Overall, surface visibility was poor (less than 25 percent) because of dense grass cover, but sparse lithic artifacts were scattered along the road and just south of the borrow pit. Because potential for intact subsurface cultural deposits was extremely limited, no further work was done in Subarea A.

The Pleistocene terrace slopes gently down to a narrow (<25 m wide) T_1 terrace designated as Subarea B. This surface rises 1.5–2.0 m above the channel and is slightly beveled or sloping. A few cutbank exposures revealed up to 2 m of dark loamy alluvium with gravel stringers and basal gravels. These late Holocene deposits exhibited an A-Bw profile consisting of a dark brown to gray loam underlain by a grayish brown clay loam. The area supports dense grasses, along with sycamore, hackberry, and cedar elm trees; surface visibility is generally poor. The City of Killeen Southwest Interceptor pipeline disturbed the northwest and central portions of the subarea where it parallels the road and crosses South Nolan Creek. Although no cultural materials were observed on the surface or in the cutbank, the 2-m-thick Holocene-aged deposits had the potential to contain buried archeological remains. Formal testing of Subarea B was initiated.

Test Excavations

On 29 September 2000, Kleinbach (Fort Hood Cultural Resources Management Office) requested a digging permit so that excavations could be conducted at 41BL989-B. On 10 October 2000, Mehalchick (Prewitt and Associates) and Tofoya (Engineering Plans and Services-Utilities) visited the site to mark any Fort Hood utility lines. None occurred within the site area, but a City of Killeen sewer line and manhole were present. Because markers and surface disturbance clearly differentiated the sewer line right of way, no excavations were placed in the disturbed area.

On 31 October 2000, formal testing at 41BL989-B was completed (Figure 5.14). The excavations consisted of three backhoe trenches (Backhoe Trenches 1–3) and two 1x1-m test units (Test Units 1–2). A total of 1.9 m^3 was manually excavated.

The trenches were excavated until dense gravels or the water table was encountered. Backhoe Trench 1 was situated near the east end of the subarea, ca. 3 m north of the creek. The trench had maximum dimensions of 10.5x0.7x1.6 m and exposed no cultural materials. Backhoe Trench 2 was located about 45 m west of Backhoe Trench 1 and ca. 45 m east of the wastewater pipeline creek crossing. The trench measured 7.0x0.7x0.9 m and encountered no cultural materials. Excavated near the west margin of the subarea, Backhoe Trench 3 was located west and north of the wastewater pipeline crossing and the creek, respectively. The trench had maximum dimensions of 7.0x0.7x1.1 m and was culturally sterile.

Test Unit 1 was excavated 2 m west of Backhoe Trench 1, and Test Unit 2 was situated just north of Backhoe Trench 3. The manual excavations in the two units were terminated when dense gravels were encountered between 90 and 100 cm.

Site Extent and Depth

The alluvial terrace (Subarea B) is wedged between the higher Pleistocene terrace to the north and South Nolan Creek on the south, but it continues an unknown distance to the east and west. Based on past investigations and the testing results, 41BL989-B measures approximately 137 m east-west by 25 m north-south. The excavations did not yield any prehistoric artifacts or produce any evidence of in situ cultural deposits.

Sediments and Stratigraphy

The 163-cm-thick profile of Backhoe Trench 1 exhibits an Ap-A-Bw soil profile formed on late Holocene alluvium. The Ap horizon (0–48 cm) is imprinted on Ford alluvium and slopewash. It is a very dark gray clay loam with 40–50 percent limestone gravels. The A horizon (48–122 cm) formed on Ford alluvium and is a very dark gray clay with 10 percent limestone gravels. The horizon also contains a thin bed of rounded pebble-sized gravels at 91 cm. The Bw horizon

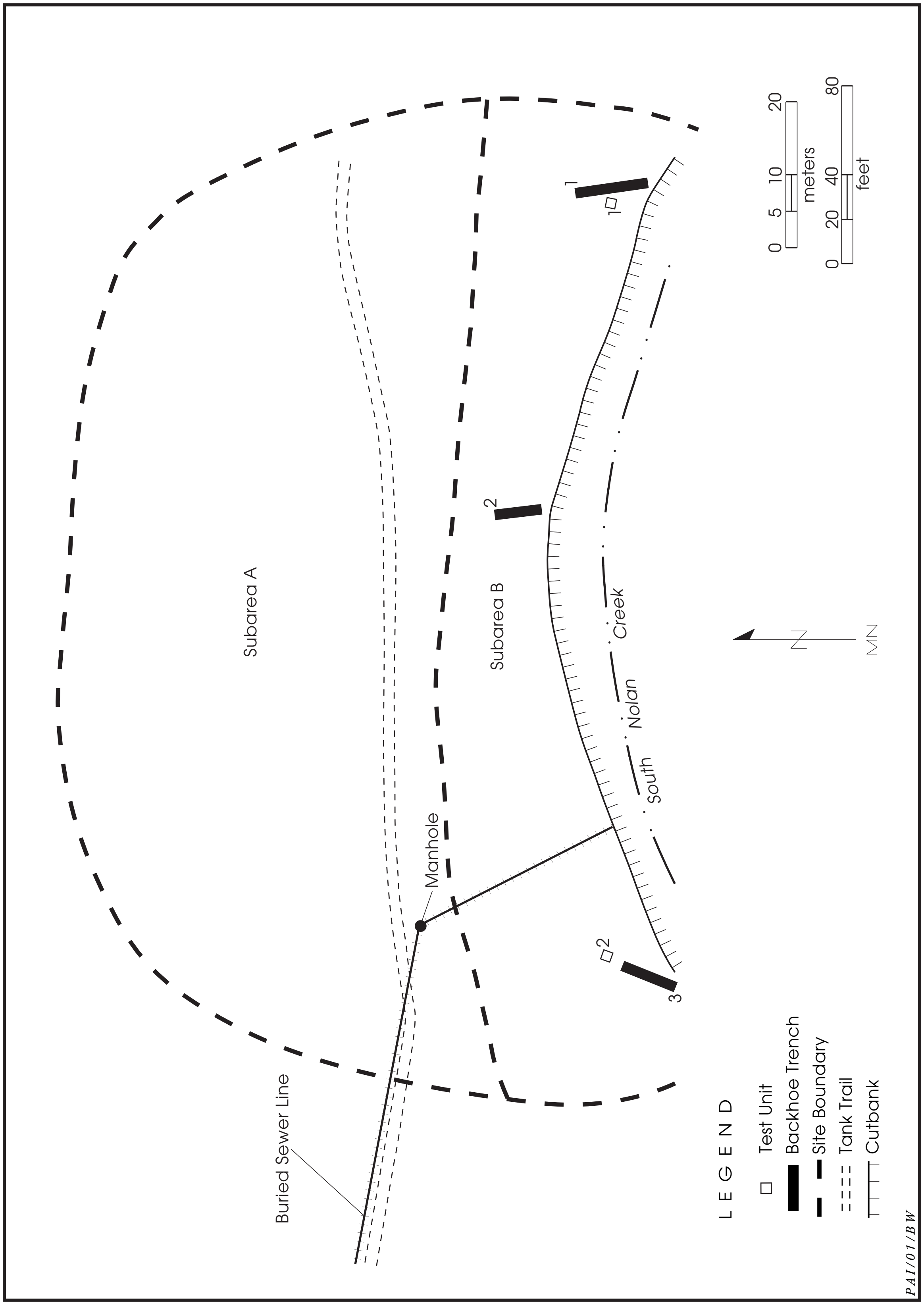

Figure 5.14. Site map of 41BL989.

(122–163+ cm) is a dark gray clay with 25 percent limestone gravels imprinted on West Range alluvium.

Backhoe Trench 2 consists of Ford and West Range alluvium and slopewash imprinted with an A-Bw soil profile. The A horizon (0–25 cm) is a very dark gray silty clay loam with 10 percent limestone gravels. The Bw horizon (25–79+ cm) is a grayish brown clay with 20 percent limestone gravels and common redoximorphic features (i.e., mottling caused by reduction and oxidation of iron and manganese as the water table fluctuates).

Cultural Materials

Although four small burned rocks were found in the upper 40 cm of deposits in Test Unit 1, a Pepsi can, plastic, a metal screw, and green glass fragments were found from 30 to 50 cm. No cultural materials were recovered from 50 to 100 cm. All nine levels (0–90 cm) excavated from Test Unit 2 were devoid of cultural materials. A dense gravel deposit at 40–50 cm was removed and not screened.

Discussion

The absence of subsurface prehistoric cultural materials in the test excavations indicates that no intact archeological components are present. Very gravelly matrices indicating high-energy fluvial deposits typically are not conducive to preserving intact cultural deposits. Based on the testing results, 41BL989-B is recommended as not eligible for listing in the National Register.

41BL991-B

Site Setting

The site is situated in an open maintained park bordered by South Nolan Creek to the south and one of its tributaries to the northeast (Figure 5.15). The confluence of the two drainages occurs at the east end of the site. Most of the area is covered by dense grass, with mixed hardwoods along the creek bank and on the eastern third of the site. Site elevation is 250–260 m above mean sea level.

Previous Work

Garza, Stocker, and Dureka (Texas A&M University) recorded the site on 27 November 1991 (Thoms 1993:94–95). The 710x230-m site consisted of a lithic and burned rock scatter. Flakes, cores, utilized flakes, and burned rocks were observed in dirt roads, and one flake and several burned rocks were exposed at ca. 50 cm in the tributary cutbank. An untyped dart point and a notched quartzite pebble resembling a Waco sinker (Turner and Hester 1993:316–317) were collected. The depth of the deposits was greater than one meter. Erosion, recreational use, vehicles, and possible looting affected an estimated 36 percent of the site. Site FN 2000 (field number) was noted within the tributary at the northeast boundary of 41BL991. No site map or data were available, but FN 2000 encompassed a paleontological deposit known as Briuer's mammoth site (named for Fred Briuer, Fort Hood base archeologist from 1977 to 1988).

In April 2000, Kleinbach (Fort Hood Cultural Resources Management Office) visited the site to differentiate depositional areas with archeological potential (personal communication 2000). Formal testing, consisting of 16 backhoe trenches and 8 m^2 of manually excavated test units, was recommended to determine National Register eligibility.

Work Performed

Geomorphic Reconnaissance

Mehalchick and Kibler (Prewitt and Associates) visited and evaluated the site on 11 October 2000. Because archeological potentials and geomorphic contexts differed, the site was divided into Subareas A and B. The overall site dimensions established in 1991 were not changed. Although no records were found for FN 2000, a mammoth tusk curated at the Fort Hood Cultural Resources Management Office laboratory was collected from this paleontological locality. The tusk was apparently found in the creek bed in the vicinity of 41BL991, but there are no records to indicate where it may have originated or whether any other bones were associated. An extensive search of exposed Pleistocene alluvial deposits along the tributary

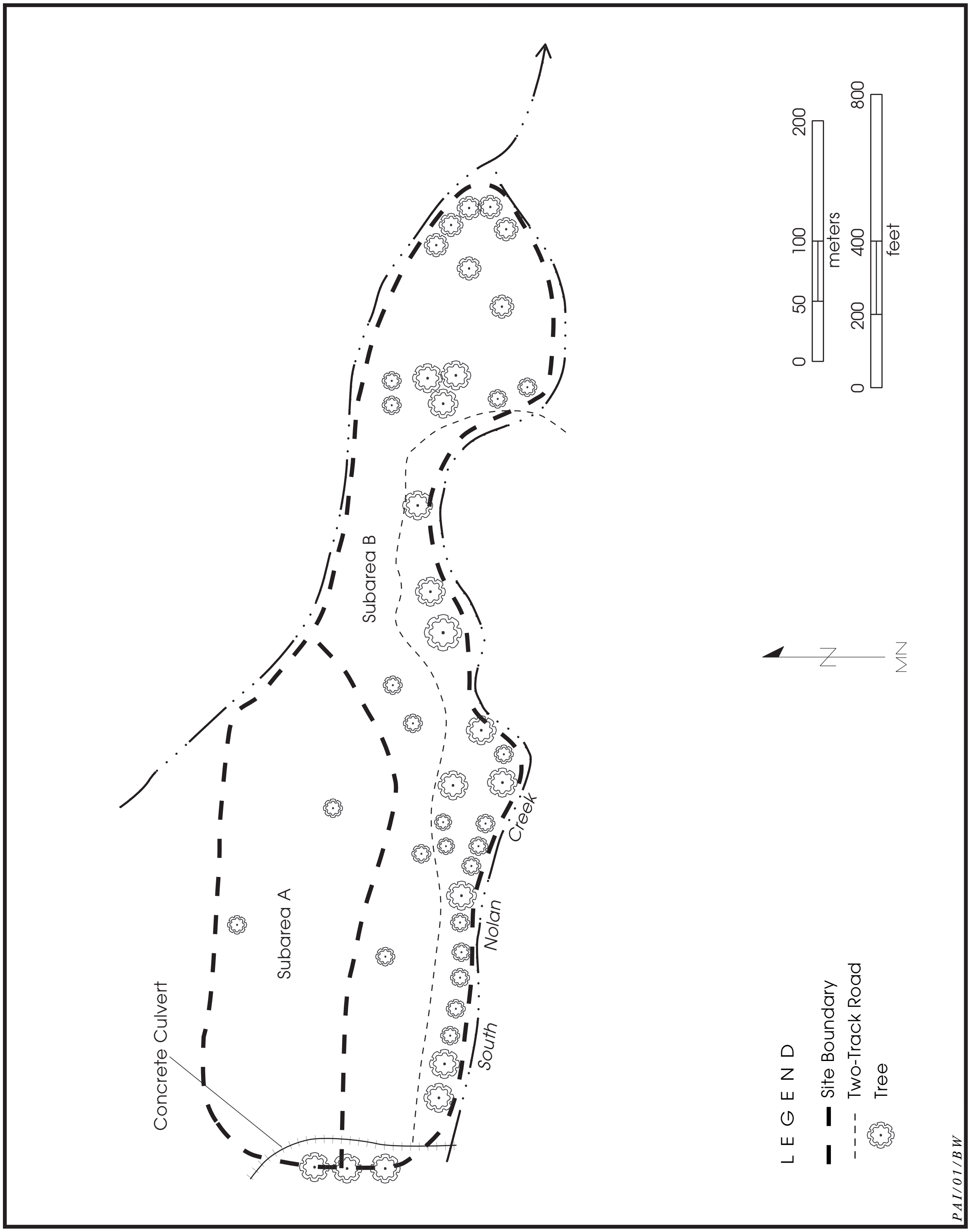

Figure 5.15. Site map of 41BL991 (modified from 2000 Fort Hood database aerial photo).

failed to find evidence suggesting the presence of mammoth remains. Lacking other evidence related to this find, it was concluded that the tusk probably washed in from further upstream.

Rising 3–4 m above the channel, the higher terrace (T_2) is defined as Subarea A. The terrace margin is beveled and gently merges with the lower terrace surface on the eastern and western ends of the site. In contrast, at the southern end of the site a 1–2-m-high scarp separates the higher terrace from the lower terrace. A 3–4-m-high cutbank along the unnamed tributary exposes gravelly alluvium resting on a strath terrace. Based on the elevation and the nature of the deposits, the terrace appears to be late Pleistocene and correlates to the Jackson alluvium (Nordt 1992). A sparse scatter of lithic artifacts was observed across the surface. Covered by patches of short grass and nearly devoid of large vegetation, this surface obviously was cleared in the past and is extensively deflated in some areas. The remnants of a sidewalk, vehicle traffic, and recreational use also have disturbed the subarea. Any potential for intact subsurface cultural deposits was negligible, so no further work was warranted for Subarea A.

Subarea B encompasses the Holocene-age terrace (T_1). Most of the terrace is comprised of a higher (T_{1a}) surface, but a small section of a lower (T_{1b}) terrace is present near the south-central portion of the subarea. A bedrock exposure along South Nolan Creek where the terrace constricted also indicates the presence of a strath terrace. The T_{1a} rises 2–3 m above the channel, and the T_{1b} is ca. 1 m above the channel. Both surfaces are nearly level, and the area supports grasses and mottes of hardwood trees; some vegetation clearing has occurred.

Exposures along the cutbank of South Nolan Creek revealed two different facies below the T_1 surface. One facies comprised 1–2 m of gravelly alluvium, and the other consisted of a 1.0–1.5-m-thick dark loamy alluvium. The gravelly facies probably corresponds to the West Range alluvium, and the more-fine-grained sediments represent either the West Range or Ford alluvium. No cultural materials were observed in situ in the cutbanks, but erosion had exposed burned rocks and flakes on the cutbank slope of South Nolan Creek above a large meander near the east end of the subarea. Vegetation clearing, two-track roads, recreational use, modern campfires, and buried utility lines have disturbed the area. A shallow depression in the south-central portion of the site may be evidence of looting or possibly mark an old latrine location. A small concrete foundation was also present just south of the tributary toward the east end of the subarea. Based on the thickness of the Holocene-age sediments and the potential for intact subsurface cultural deposits, formal testing of Subarea B was initiated.

Test Excavations

On 29 September 2000, Kleinbach (Fort Hood Cultural Resources Management Office) requested a digging permit to test 41BL991-B. Following instructions from Fort Hood Engineering Plans and Services (EPS)-Utilities, Mehalchick contacted Dig-Tess (a point of contact for various nonmilitary utility companies) and the City of Killeen Water Company on 8 November 2000 to identify any underground utility lines. Between 10 and 15 November 2000, Mehalchick received written or verbal clearance to proceed after company representatives examined the site location or conducted on-site inspections with various utility employees to mark buried lines. Companies that gave verbal clearance were TXU Gas, TXU Pipeline Services (for the Lone Star Pipeline), Southwestern Bell, and TXU Electric. The City of Killeen submitted written documentation that no water or sewer lines were present. On 11 November 2000, Mehalchick met Buster Sutherland (Time Warner Cablevision) and Randy Thornley (Central Locating Service representing Sprint), who conducted an on-site inspection. Each marked an east-west underground cable line with spray paint and pin flags at the southwest site margin. The two lines paralleled one another and extended off-site into the Venable Village subdivision. On 15 November 2000, Mehalchick and Tofoya (Fort Hood EPS-Utilities) visited the site to mark any military utility lines. A second telephone line and a water pipeline were marked with spray paint. Both lines were oriented north-south and located at the west end of the site. Because the water pipeline was constructed of asbestos concrete, its exact location could not be determined with a metal detector. A 25-ft buffer zone on either side of the marked water line was recommended. All four underground

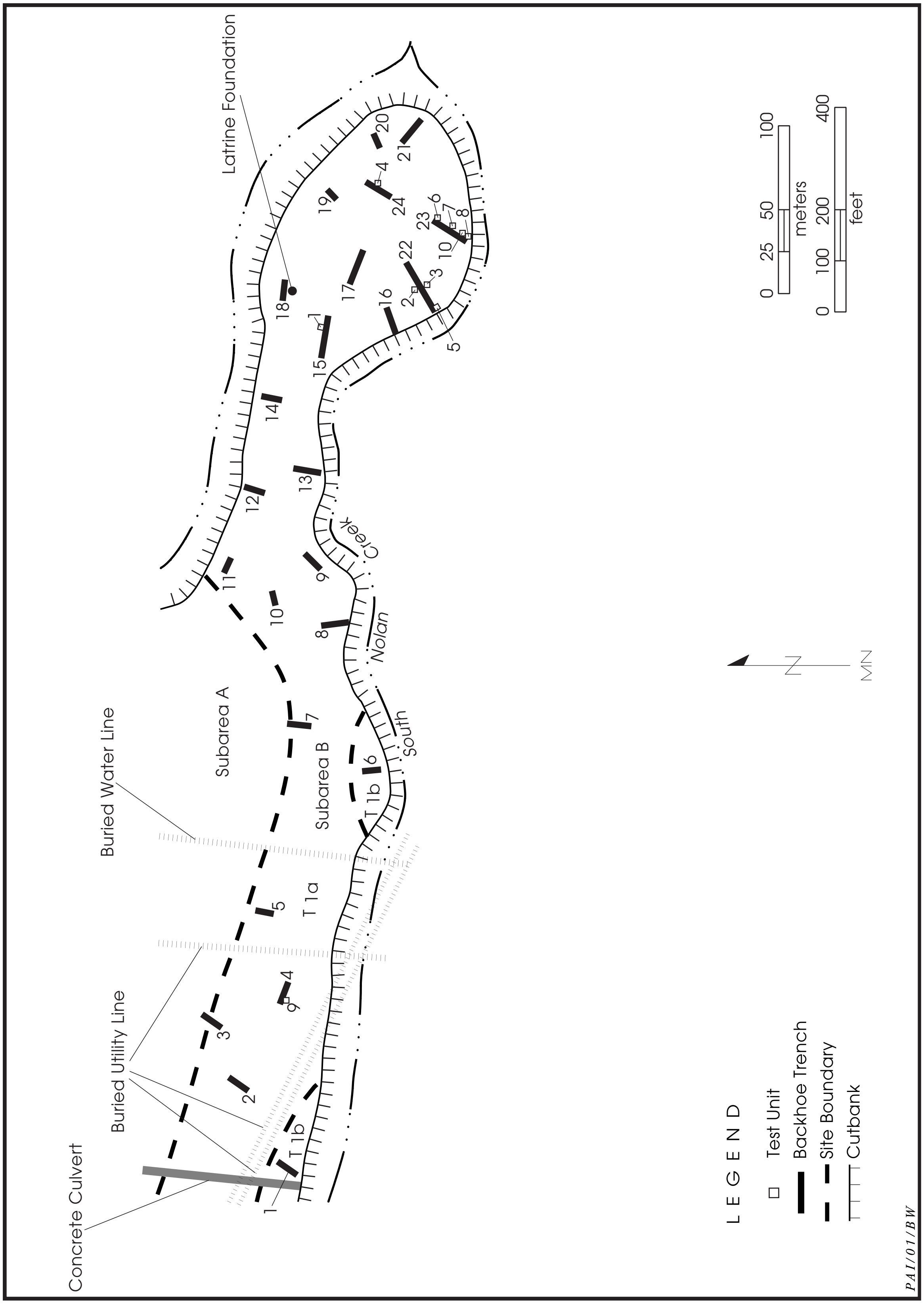

Figure 5.16. Map of 41BL991-B showing locations of 2000–2001 testing.

Table 5.9. Backhoe trenches at 41BL991-B

Backhoe Trench	Maximum Dimensions (m)	Orientation	Geomorphic Setting	Cultural Materials Observed
1	6.5x0.7x1.2	14°	T_{1b}	
2	10.5x0.7x2.4	30°	T_{1a}	unburned limestone, chert nodules, and 1 flake at 140–150 cm; flake probably redeposited
3	3.0x0.7x0.5	35°	T_{1a}/T_2 interface	
4	7.0x0.7x2.1	90°	T_{1a} with buried paleosol	
5	7.25x0.70x2.00	357°	T_{1a}	
6	8.0x0.7x1.0	345°	T_{1b}	
7	10.0x0.7x2.1	350°	T_{1a}/T_2 interface with buried paleosol	
8	14.0x0.7x2.7	348°	T_{1a} with buried paleosol	
9	14.0x0.7x2.7	30°	T_{1a} with buried paleosol	
10	6.0x0.7x1.2	80°	T_{1a}	metal wire at 0–10 cm
11	9.5x0.7x1.7	104°	T_{1a}	
12	9.0x0.7x2.0	10°	T_{1a}	
13	12.00x0.70x1.75	360°	T_{1a}/strath terrace	
14	10.0x0.7x2.1	360°	T_{1a}	
15	24.0x0.7x1.9	90°	T_{1a} with buried paleosol; western end is strath terrace	burned rocks at 65–90 cm and 1 core at 110–120 cm in the buried paleosol
16	15.0x0.7x2.2	60°	T_{1a} with buried paleosol	glass fragments at 0–20 cm; small cluster of burned rocks and occasional burned rock at 60–80 cm in the buried paleosol
17	16.5x0.7x1.6	106°	T_{1a} with buried paleosol	
18	9.0x0.7x1.9	85°	T_{1a} with buried paleosol	
19	6.50x0.70x1.45	25°	T_{1a}/strath terrace	
20	10.0x0.7x1.5	50°	T_{1a}/strath terrace	
21	16.0x0.7x2.1	300°	T_{1a} with buried paleosol	tested cobble and *Rabdotus* snail shells at 50–80 cm in the buried paleosol
22	30.0x0.7x2.2	50°	T_{1a} with buried paleosol	burned rocks and probable burned rock feature at 80–100 cm and 1 biface at 75–95 cm in the buried paleosol
23	24.0x0.7x3.1	20°	T_{1a} with buried paleosol	few burned rocks at 60–65 cm and bison bones at 100 cm above the buried paleosol; burned rocks at 100–150 cm in the buried paleosol
24	14.0x0.7x1.6	20°	T_{1a} with buried paleosol	burned rocks and tested cobble at 50–60 cm in the buried paleosol

utility lines were marked on the aerial photo site map.

On 12 January 2001, formal testing at 41BL991-B was completed (Figure 5.16). Excavations consisted of 24 backhoe trenches (Backhoe Trenches 1–24) and 10 test units (Test Units 1–10). Each manual excavation began as a 1x1 m unit, but most units adjoining backhoe trenches were expanded to 1.0x1.6 m to include the floor of the trench (i.e., Test Units 2–4 and 6–8). Four test units (Test Units 1 and 5–7) were terminated at arbitrary depths, but the remaining six (Test Units 2–4 and 8–10) ended on dense gravels. A total of 12.68 m^3 was manually excavated.

Twenty trenches (Backhoe Trenches 2, 4, 5, and 8–24) were excavated on the T_{1a} beginning at the west end of the site and continuing east (Table 5.9). Backhoe Trenches 3 and 7 were placed on the T_{1a}/T_2 interface, and Backhoe Trenches 1 and 6 were situated on the T_{1b}. Fifteen trenches were oriented along a general north-south axis; the rest were aligned primarily east-west. Most were excavated perpendicular to South Nolan Creek or the tributary. The trenches ranged from 3 to 30 m long, were 0.7 m wide, and varied from 0.5 to 3.1 m deep. Most trench excavations were terminated when Pleistocene-age sediments, the channel bed, or the water table were encountered. During trenching, backhoe operator Lester Duncan (Fort Hood Directorate of Public Works, Maintenance Division) noted that a concrete foundation situated south of the tributary was for a military latrine. These foundations were relatively common many years ago, but many have been removed. The depression near the south-central terrace margin may be the result of one such removal, rather than the result of looting.

No cultural materials were observed in most of the backhoe trenches located in the central or western portions of 41BL991-B. No cultural materials were observed in either of the trenches on the T_{1b} (Backhoe Trenches 1 and 6) or in either of the trenches at the T_{1a}/T_{1b} interface (Backhoe Trenches 3 and 7). A single flake was observed at 140–150 cm in Backhoe Trench 2, the westernmost trench on the T_{1a}, but it appeared to be in a redeposited context along with other unburned limestone and unmodified chert gravels.

Cultural materials and intact archeological deposits were observed in 6 of the 10 trenches in the eastern end of Subarea B. All of these trenches were located on the T_{1a}, and 8 of the 10 trenches (Backhoe Trenches 15–18 and 22–24)) exposed a buried paleosol with a generalized A-B-C soil profile. The top of the paleosol appeared at various depths between 45 and 130 cm, but in most locations the buried paleosol appeared at ca. 65–90 cm. The only cultural materials observed above the paleosol were burned rocks at 60–65 cm and bison bones from 100 cm (the latter were just above the top of the paleosol) in Backhoe Trench 23. A right bison calcaneus was collected from the trench; other bones were collected when adjacent Test Unit 8 was excavated. Burned rocks were observed in the paleosol in Backhoe Trenches 15, 16, 22, 23, and 24, and chipped stone artifacts were observed in the paleosol in Backhoe Trenches 15, 21, 22, and 24. One core and two tested cobbles were collected from the paleosol exposed in Backhoe Trenches 15, 21, and 24, along with one early- to middle-stage biface from the same context in Backhoe Trench 22. A charcoal sample collected from Backhoe Trench 15 at 85–90 cm was identified as *Quercus* sp. wood.

Nine of the 10 test units were excavated in the eastern end of the site where cultural materials were observed (Figure 5.17), but Test Unit 4 was excavated in the western end of the site. All of the manual excavations were terminated at arbitrary depths. Test Unit 1 was placed beside the north wall of Backhoe Trench 15 near the east end of the trench above the burned rocks observed at 65–90 cm. Test Unit 2 was situated along the north wall of Backhoe Trench 22 above a probable burned rock feature at ca. 80–90 cm. Test Unit 3 was also located over the same probable burned rock feature, but it was placed on the south side of Backhoe Trench 22 opposite Test Unit 2. Because there were no cultural materials in the upper levels of Test Units 1 and 2, the upper 60 cm (Levels 1–6) of deposits in Test Unit 3 were manually removed and not screened. Test Unit 4 was placed along the east wall of Backhoe Trench 24 above burned rocks observed at 50–60 cm. At the west end of Backhoe Trench 22, Test Unit 5 was situated along the south wall to sample a buried soil containing burned rocks from 90 to 100 cm. The upper 80 cm of deposits was removed with a backhoe, and four levels from 80 to 120 cm were manually excavated. Near the north end of Backhoe Trench 23, Test Unit 6 was placed adjoining the east wall of the trench above several burned rocks observed at 120–130 cm. Test Unit 7 was located along the midpoint of the Backhoe Trench 23 east wall above a few burned rocks observed at ca. 150 cm. Because there were no cultural materials in the upper meter of Test Unit 6, the upper 91–100 cm of deposits were removed with a backhoe. Test Unit 8 was situated beside the east wall of

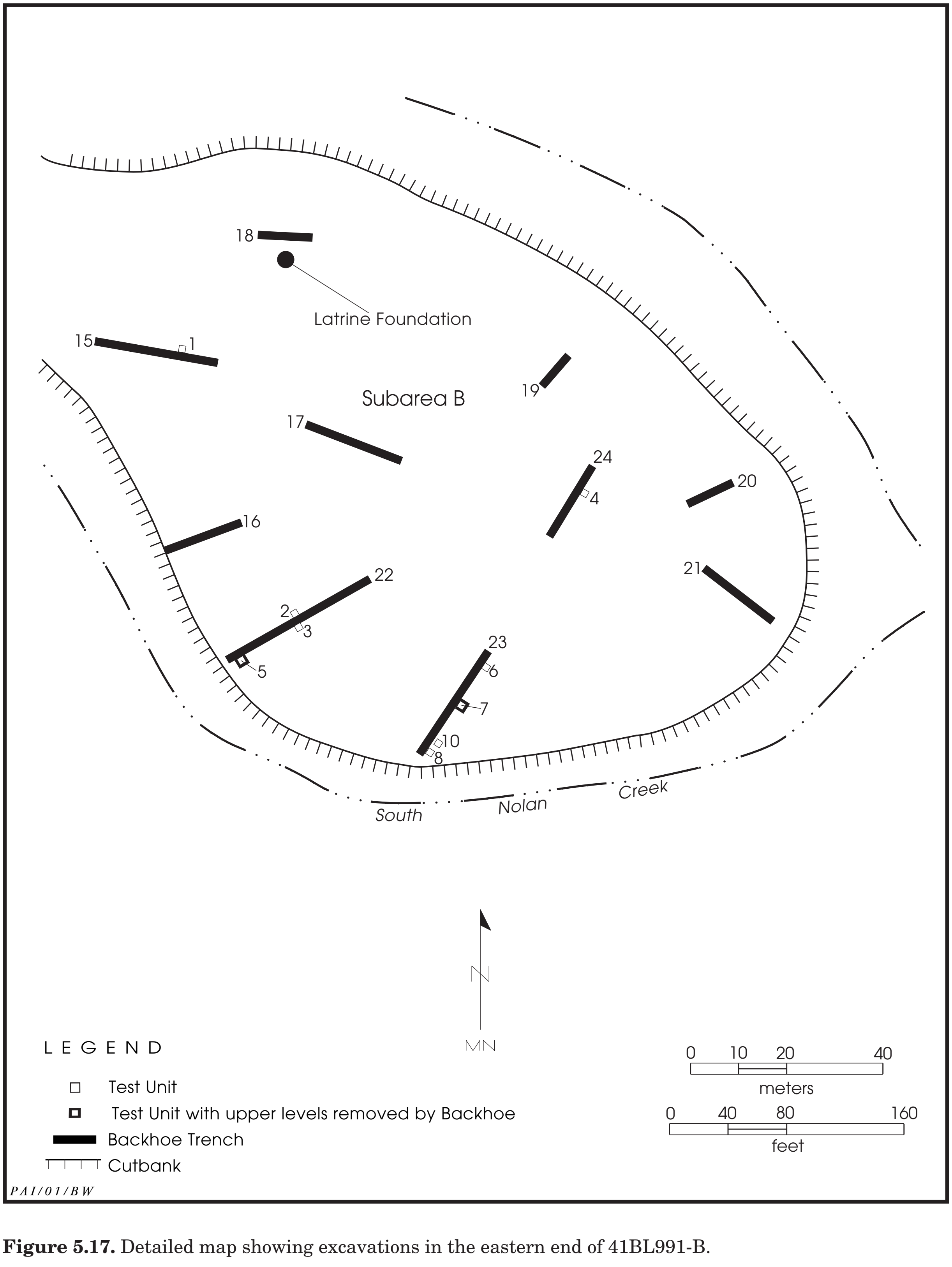

Figure 5.17. Detailed map showing excavations in the eastern end of 41BL991-B.

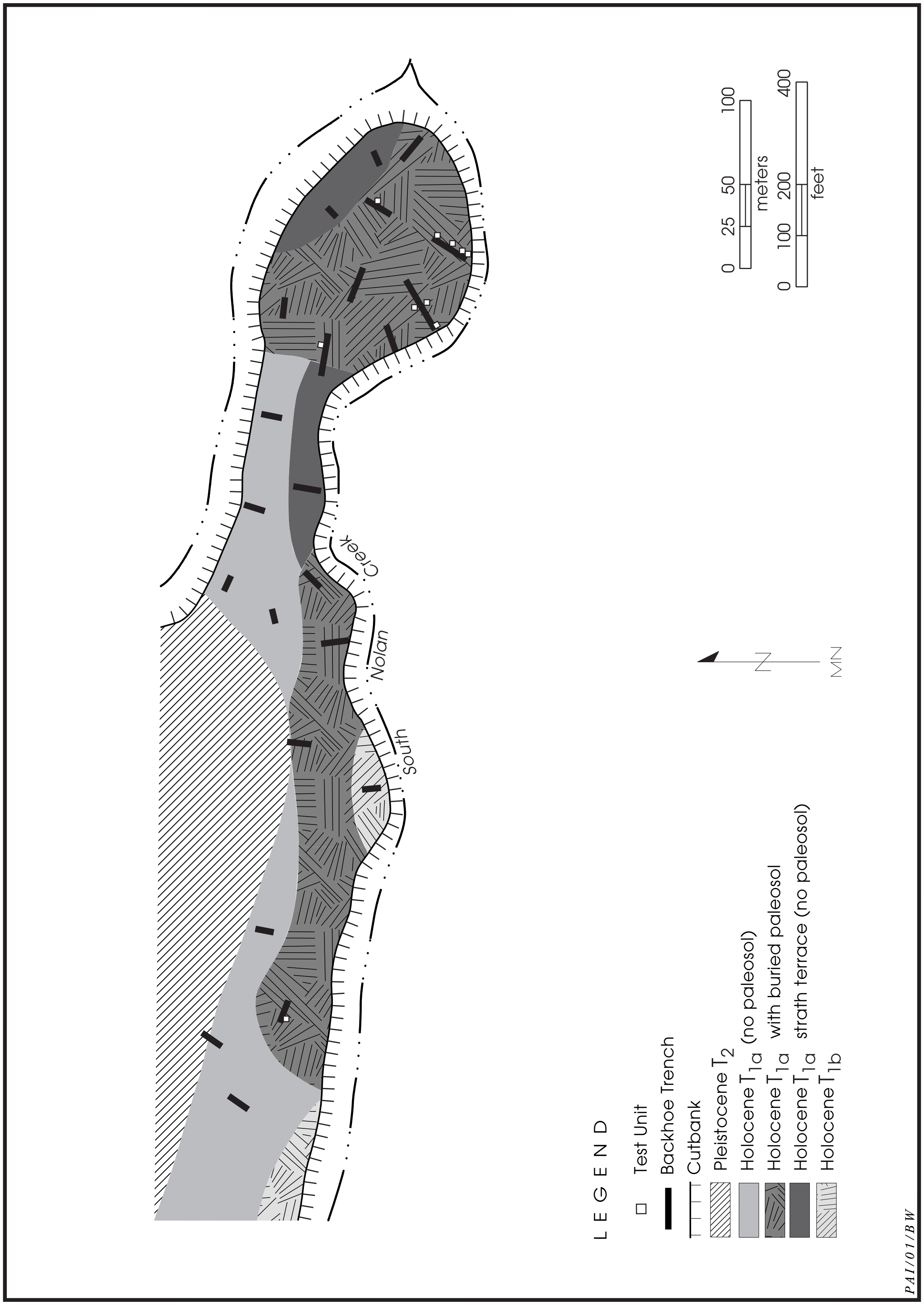

Figure 5.18. Geomorphic map of 41BL991-B

Backhoe Trench 23 at the south end of the trench and centered over the bison bones observed at ca. 100 cm. The upper three levels (0–30 cm) were manually removed and not screened because modern items found in nearby test units indicated severe disturbance. Test Unit 9 was placed along the south wall of Backhoe Trench 4 to sample deposits in the western end. Test Unit 10 was situated 40 cm north of the north wall of Test Unit 8 and less than 10 cm east of the east wall of Backhoe Trench 23.

While the excavations at 41BL991-B were in progress, an on-site archeological tour was arranged. Fort Hood Cultural Resources Management Office staff and Prewitt and Associates personnel gave a tour of the excavations to military personnel including base commander Colonel B. David Hall, civilian employees of the Department of Public Works, and others.

Site Extent and Depth

Site 41BL991-B subsumes the large T_1 surface associated with South Nolan Creek and its tributary and is delimited by the two drainages and their confluence, a Pleistocene terrace, and the Venable Village housing subdivision. Having maximum dimensions of 625 m east-west by 125 m north-south, the T_1 consists of a higher T_{1a}, a lower T_{1b}, and a remnant strath terrace. Comprising approximately 25 percent of the entire Holocene terrace, the lower T_{1b} and strath terrace deposits contained no intact prehistoric remains. Several excavations on the expansive T_{1a} encountered stratigraphically discrete cultural deposits at the eastern end of the terrace near the confluence of South Nolan Creek and its tributary. Based on the testing results, the area containing buried cultural remains occurs east of (and includes) Backhoe Trench 15, encompassing 125 m north-south by 150 m east-west (see Figure 5.17).

Sediments and Stratigraphy

Based on an examination of the surface topography and the subsurface exposures provided by the 24 backhoe trenches, a geomorphic map of 41BL991-B was constructed (Figure 5.18). This map shows the probable extent of the various landforms—T_2, T_{1a}, T_{1a}/strath, T_{1a} with buried paleosol, and T_{1b}—as inferred from the stratigraphic evidence. Fourteen profiles in 13 backhoe trenches are described in Appendix B, but only selected trench profiles are described below.

Excavated on the separate segments of T_{1b}, Backhoe Trenches 1 and 6 reveal similar profiles. The 100-cm-thick soil profile of Backhoe Trench 1 formed in fine-grained channel margin and gravelly channel alluvium that probably correlates to Ford alluvium (Nordt 1992). The A horizon (0–18 cm) is very dark brown silty clay loam exhibiting weak coarse subangular blocky structure. The BC horizon (18–39 cm) is a matrix-supported gravel bed with very pale brown silty clay loam. It contains 35–60 percent subrounded limestone granules and pebbles, along with common distinct gray and yellow mottles. The 2Btssb horizon (39–50 cm) is black silty clay with moderate coarse angular blocky structure, common fine distinct clay cutans on ped faces, few interlocking slickensides, and less than 15 percent subangular limestone granules and pebbles. The 3C horizon (50–100 cm) is yellowish brown gravelly loamy sand that exhibits planar bedding and contains poorly sorted subrounded limestone granules and pebbles.

The T_{1a} dominates the site area and is composed of interbedded channel and channel margin sediments deposited by both South Nolan Creek and its tributary. Twelve of 22 backhoe trenches (Backhoe Trenches 4, 7–9, 15–18, and 21–24) excavated on this surface or at its interface with the higher Pleistocene terrace exposed buried soils. Based on sedimentary characteristics and soil morphology, these deposits correlate to the Ford and West Range alluvial units (Nordt 1992). Near the west end of the site, Backhoe Trench 4 reveals a 173-cm-thick profile formed in fine-grained channel margin alluvium. The A horizon (0–56 cm) is a dark brown silty clay loam exhibiting weak medium subangular blocky structure, few fine clay cutans on ped faces, and less than 15 percent subrounded limestone granules and pebbles. The Ab horizon (56–80 cm) is a black silty clay loam with weak coarse angular blocky structure, fine common prominent clay cutans on ped faces, and less than 15 percent subangular granule and pebbles. At 80–173 cm, the Btb horizon consists of a grayish brown silty clay with characteristics similar to the Ab horizon but also exhibiting common medium distinct yellowish brown mottles.

Near the midpoint of the site, the sediments

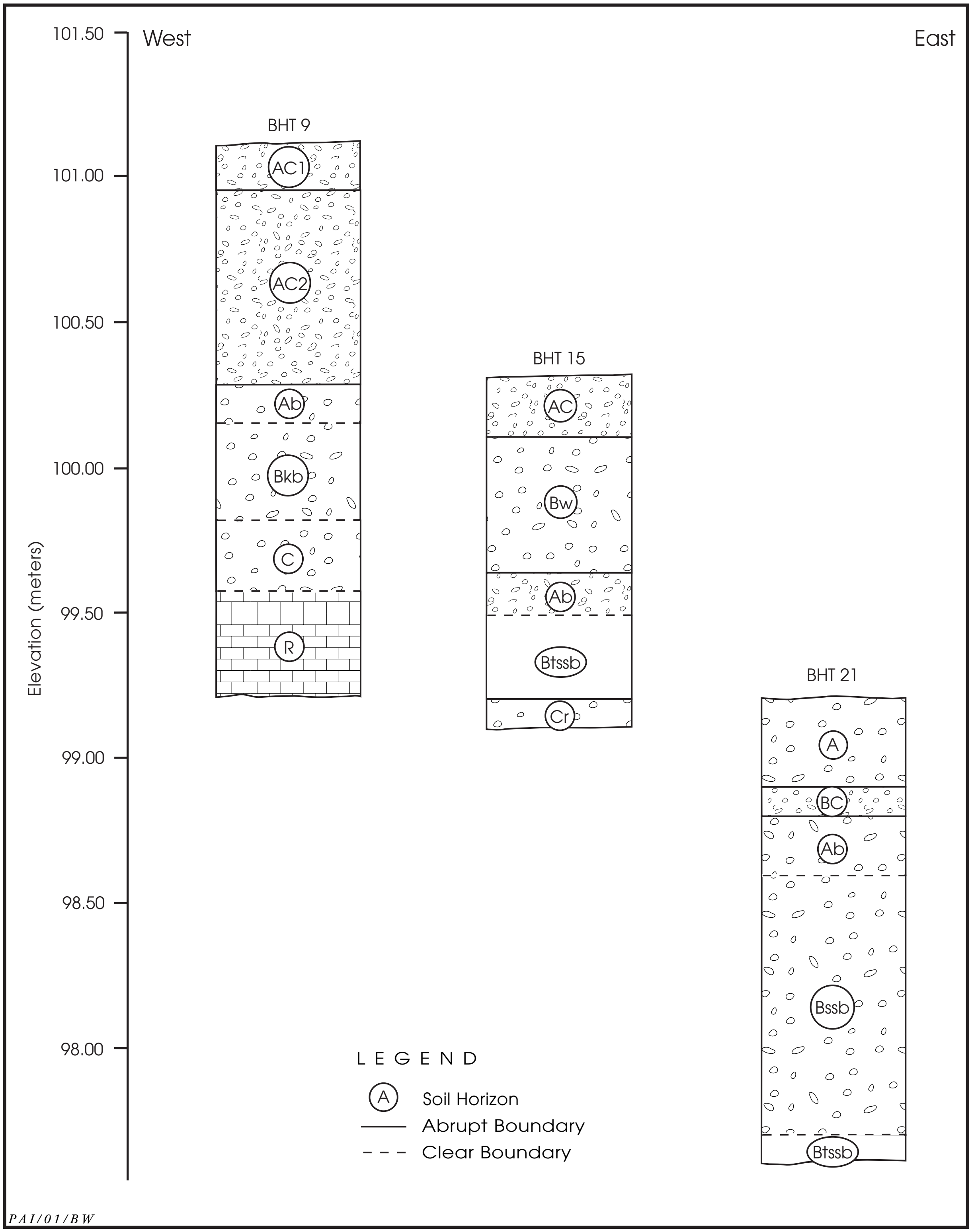

Figure 5.19. Profiles of Backhoe Trenches 9, 15, and 21, 41BL991-B.

in Backhoe Trench 9 consist of fine-grained channel margin and gravelly channel deposits (Figure 5.19). The AC1 horizon (0–15 cm) is a very dark gray silty clay loam with weak fine granular structure and 35–60 percent poorly sorted subrounded to subangular limestone granules, pebbles, cobbles, and fossil shell fragments. The AC2 horizon (15–82 cm) is a dark gray gravelly silty clay loam matrix-supported gravel bed with weak fine subangular blocky structure and 35–60 percent poorly sorted, subrounded to subangular limestone granules, pebbles, cobbles, and fossil shell fragments. The Ab horizon (82–95 cm) comprises a very dark grayish brown silty clay loam with weak medium subangular blocky structure and less than 15 percent very coarse subrounded sand and granules. The Bkb horizon (95–130 cm) is a dark grayish brown silty clay loam with moderate coarse subangular blocky structure and common fine irregular carbonate concretions. The C horizon (130–155 cm) consists of a very dark grayish-brown, silty clay with moderate coarse angular blocky structure and less than 15 percent subangular limestone granules and common fine distinct clay cutans on ped faces. The R horizon (155–190+ cm) is very pale brown limestone bedrock.

The 110-cm-thick profile of Backhoe Trench 15 (western portion of the trench) is composed of interbedded channel margin and channel alluvium. The AC horizon (0–20 cm) is a pale brown gravelly silty clay loam, matrix-supported gravel bed with weak medium subangular blocky structure and 15–35 percent subrounded limestone granules, pebbles, cobbles, and chert cobbles. The Bw horizon (20–67 cm) is a yellowish brown coarse sandy loam with moderate coarse subangular blocky structure and less than 15 percent subangular limestone granules. The Ab horizon (57–83 cm) is a black silty clay with moderate coarse angular blocky structure and 15–35 percent subrounded limestone granules, common fine irregular carbonate concretions, and common fine prominent clay cutans on ped faces. The Btssb horizon (83–110 cm) is a dark brown massive clay with common interlocking slickensides. The Cr horizon (110+ cm) is very pale brown weathered limestone bedrock.

Backhoe Trench 21, located closest to the confluence of the tributary and South Nolan Creek, consists of 150+ cm of fine-grained channel margin deposits. The A horizon (0–33 cm) is a dark grayish brown silty clay with moderate medium subangular blocky parting to platy structure, common fine distinct clay cutans on ped faces, and less than 15 percent subangular limestone granules, pebbles, and cobbles. The BC horizon (33–44 cm) comprises a very dark grayish brown gravelly sandy clay, matrix-supported gravel bed with 35–60 percent subrounded very coarse sand and limestone granules and pebbles. The Ab horizon (44–62 cm) is a very dark grayish brown silty clay loam exhibiting weak coarse subangular blocky structure, less than 15 percent subrounded limestone granules and pebbles, and few fine distinct clay cutans on ped faces. The Bssb horizon (62–150 cm) consists of a grayish brown silty clay loam with moderate coarse angular blocky structure, less than 15 percent subrounded to subangular limestone pebbles, common medium distinct yellowish brown and gray mottles, common interlocking slickensides, and common iron nodules. The Btssb horizon (150+ cm) is a massive silty clay with common fine distinct medium yellowish brown and gray mottles and common fine prominent clay cutans on ped faces.

Backhoe Trenches 22 and 24 show similar soil profiles (Figure 5.20). Backhoe Trench 22 revealed a 142-cm-thick profile in gravelly channel and interbedded fine-grained channel margin alluvium. The A horizon (0–22 cm) is dark yellowish brown silty clay loam. The Bw horizon (22–46 cm) is yellowish brown silty clay loam with weak coarse subangular blocky structure. The C1 horizon (46–53 cm) is a very pale brown clast-supported gravel bed with subangular to subrounded very coarse sand and granules with few subrounded limestone pebbles oriented 45°. The C2 horizon (53–73 cm) is very pale brown clast-supported gravel bed with common subrounded limestone granules and pebbles oriented 40°. The 2Ab horizon (73–111 cm) is a black gravelly silty clay with moderate subangular blocky structure and 15–35 percent subrounded very coarse sand and limestone granules, common interlocking slickensides, and common fine clay cutans on ped faces and pores. The 2BCb horizon (111–142 cm) is very dark gray silty clay, matrix-supported gravel bed exhibiting moderate angular blocky structure and subangular to subrounded limestone granules and pebbles and common interlocking slickensides. The 2Btssb horizon (142+ cm) is a dark brown clay with

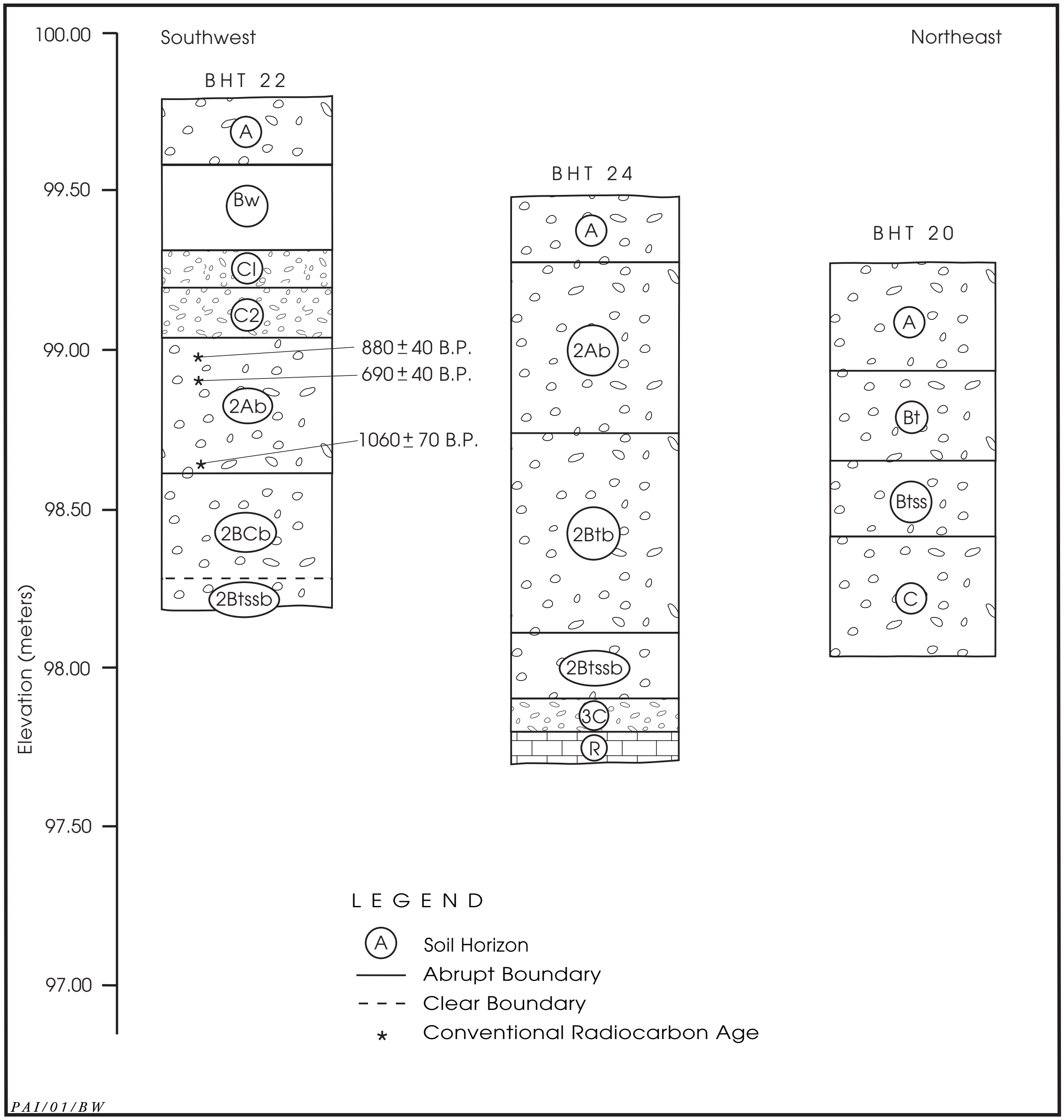

Figure 5.20. Profiles of Backhoe Trenches 20, 22, and 24, 41BL991-B.

moderate coarse subangular blocky structure and less than 15 percent subangular limestone pebbles and cobbles, many interlocking slickensides, medium common clay cutans on ped faces and pores.

Backhoe Trench 23 revealed fine-grained channel margin alluvium. The A horizon (0–21 cm) is a dark grayish brown silt loam with weak medium subangular blocky structure and less than 15 percent subrounded limestone granules. The AB horizon (21–72 cm) is comprised of a dark grayish brown silty clay loam with weak medium subangular blocky structure and less than 15 percent subrounded very coarse sand and limestone granules. The C horizon (72–129 cm) consists of interbedded silty clay and gravel beds. The clay is a very dark grayish brown silty clay loam with moderate medium subangular blocky structure and light olive brown beds of moderately sorted subrounded very coarse sand, limestone granules, pebbles, and cobbles with common carbonate coatings and filaments. The 2Abt horizon (129–161 cm) is a very dark gray clay loam with moderate coarse angular blocky parting to coarse granular structure and less than 15 percent subrounded limestone pebbles, common interlocking slickensides, and common medium prominent clay cutans and sand coats on ped faces. The 2Btssb horizon (161–205+ cm) is a very dark gray clay with strong coarse angular blocky structure and many medium prominent clay cutans on ped faces, common interlocking slickensides, and common medium carbonate concretions.

Placed on the T_{1a}–T_2 transition, the profile of Backhoe Trench 7 formed in Holocene alluvium-colluvium, but Pleistocene pebbles and cobbles were commonly observed colluvially deposited in the upper ca. 25 cm of sediment. This represents a thin drape of colluvium washed off the Pleistocene T_2 onto the Holocene terrace. The A horizon (0–33 cm) consists of a dark brown silty clay loam with weak coarse subangular blocky structure and common snail shells. The 2C horizon (33–56 cm) is a brownish yellow clast-supported colluvial gravel bed with 35–60 percent moderate to poorly sorted subangular to subrounded very coarse sand and limestone granules and pebbles. The 3Ab horizon (56–85 cm) is comprised of a black silty clay with moderate very coarse angular blocky structure and few faint clay cutans on ped faces, few interlocking slickensides, less than 15 percent subrounded granules and snail shell fragments. The 3BC (85–135 cm) horizon is a very dark grayish brown silty clay with moderate coarse subangular blocky structure, less than 15 percent subangular granule and fossil shell fragments, and fine common distinct clay cutans on ped faces and bridges.

Definition of Analysis Units

Three analysis units are identified based on gross temporal groupings of depositional units without regard to landform (Figure 5.21). Analysis Unit 1 encompasses the Ford deposits that contain one dated deposit consisting of vertebrate faunal materials. Analysis Unit 2 correlates to the ca. 20–75-cm-thick paleosol encapsulating the bulk of the prehistoric materials and four features at the site. Analysis Unit 3 subsumes the West Range alluvium underlying the buried soil; one stratigraphically discrete archeological deposit may be present here. The following discussions define the various analysis units based on the testing results. Across the entire site and even within an individual trench, the thickness of any given deposit may vary considerably according to slope.

Analysis Unit 1

Sampled in 8 of the 10 test units, Analysis Unit 1 subsumes deposits that range from 40 to 120 cm thick and extend from the surface to 120 cm. Analysis Unit 1 includes all deposits above the buried paleosol present over most of the T_{1a}, but recovery of cultural materials was sparse. The analysis unit also includes a bone recovered from Backhoe Trench 23.

Cultural Materials

Eight Test Units contained sediments assigned to Analysis Unit 1 (see Figure 5.21), but only five units (Test Units 2, 4, 7, 8, and 10) produced cultural materials. Test Units 2, 4, and 7 produced only four burned rocks (Table 5.10). Glass, metal, and plastic found from the surface to a maximum depth of 80 cm in three of the test units, indicating modern disturbances.

Test Unit 8 contained sparse cultural materials between 30 and 50 cm. At 80–110 cm, there were 20 unmodified bones representing four different taxa present (Table 5.11). Five lower leg elements were identified as cattle or bison, but the remaining 15 specimens were indeterminate fragments. Two canid- to deer-sized fragments were spirally fractured, but none of the bones exhibited burning. One bone collected from the bottom (100 cm) of Backhoe Trench 23, adjoining Test Unit 8, is an unburned calcaneus identified as *Bison bison*. A portion of this bone was removed for AMS dating and yielded a conventional radiocarbon age of 160 ± 40 B.P. (Beta-153671).

There were brown glass fragments and plastic in the upper 10 cm of Test Unit 10. Extremely gravelly sediment with cobbles up to 7 cm in diameter extended from 10 to 30 cm,

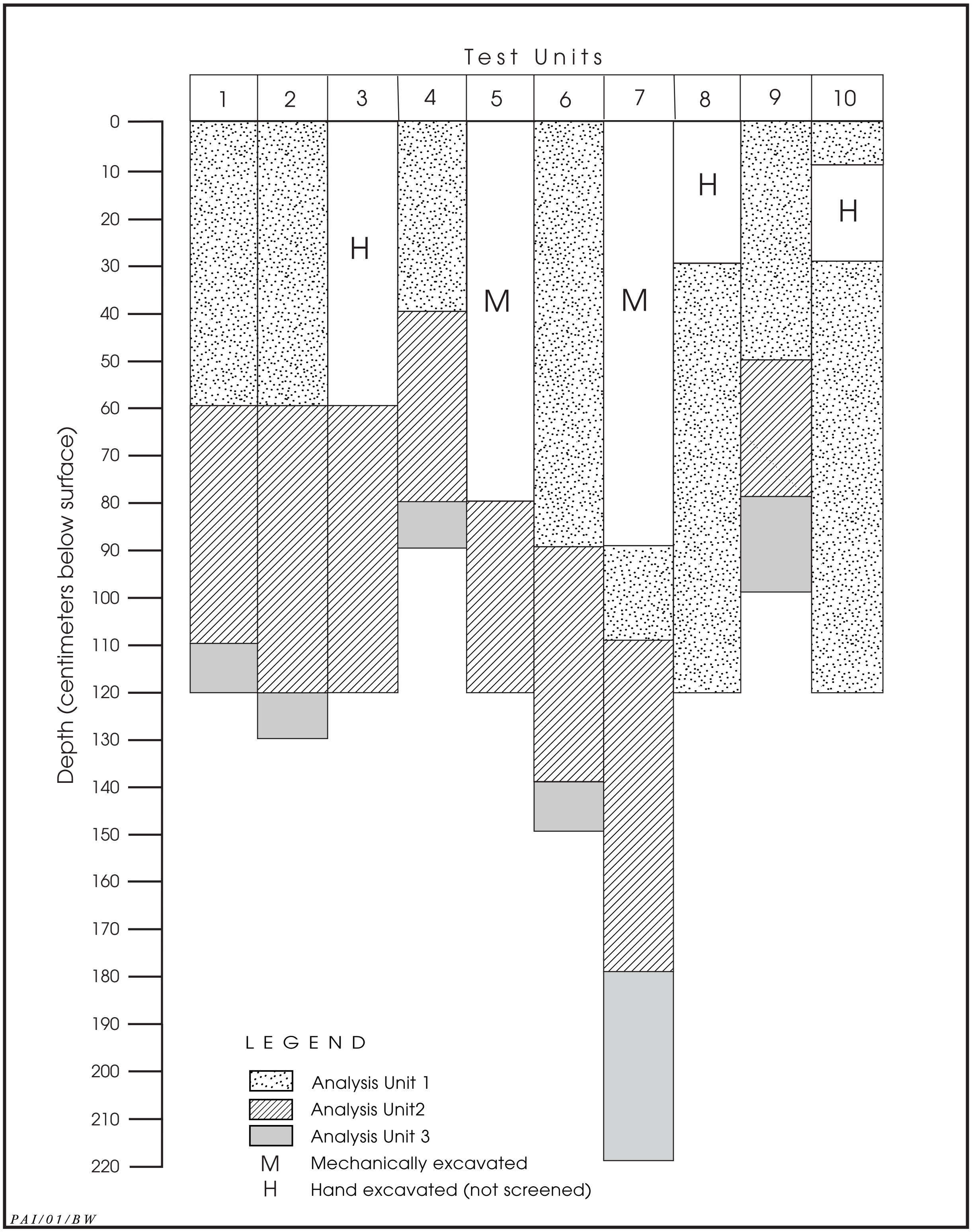

Figure 5.21. Excavation levels assigned to analysis units at 41BL991-B.

Table 5.10. Summary of cultural materials from 41BL991-B, Analysis Unit 1, Test Units 1, 2, 4, 7, 8, and 10 and Backhoe Trench 23

Provenience	Dart Point	Unmodified Debitage	Unmodified Bones	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1					
Level 1 (0–10 cm)*	–	–	–	–	–
Level 2 (10–20 cm)*	–	–	–	–	–
Subtotals	0	0	0	0	0.00
TEST UNIT 2					
Level 1 (0–10 cm)*	–	–	–	1	0.10
Level 3 (20–30 cm)*	–	–	–	–	–
Subtotals	0	0	0	1	0.10
TEST UNIT 4					
Level 4 (30–40 cm)	–	–	–	2	0.25
TEST UNIT 7					
Level 10 (91–100 cm)	–	–	–	1	1.50
TEST UNIT 8					
Level 4 (30–40 cm)	–	–	–	2	0.10
Level 5 (40–50 cm)	1	1	–	–	–
Level 9 (80–90 cm)	–	–	6	–	–
Level 10 (90–100 cm)	–	–	7	–	–
Level 11 (100–110 cm)	–	–	7	–	–
Subtotals	1	1	20	2	0.10
TEST UNIT 10					
Level 1 (0–10 cm)*	–	–	–	–	–
Level 4 (30–40 cm)*	–	–	–	–	–
Level 8 (70–80 cm)*	–	–	1	–	–
Level 10 (90–100 cm)	–	–	12	–	–
Subtotals	0	0	13	0	0.00
Backhoe Trench 23 (100 cm)	0	0	1	0	0.00
Totals	1	1	34	6	1.95

* Modern artifact found (glass, metal, or plastic).

but this fill was not screened. Another modern artifact was observed at 30–40 cm, but the unit was sterile from 40 to 70 cm. A piece of metal and a glass fragment at 70–80 cm are evidence of deep disturbances. Level 9 (80–90 cm) produced no materials, and a decayed tree stump and extensive root system encountered in the south-central portion of the unit at 80 cm extended to 100 cm. Twelve unmodified bones, including a cattle or bison cervical vertebra fragment, were found at 90–100 cm. The unit was culturally sterile at 100–120 cm.

Discussion

Two manual excavations contain sparse prehistoric and historic or modern materials in the upper 70–80 cm of Ford alluvium (A and AB horizons). Some of the recent items may be displaced downward by bioturbation. The occurrence of an untyped dart point at 40–50 cm represents a recycled artifact based on the relative age of the Ford alluvium and the recent date obtained on bone at a greater depth (see below).

Table 5.11. Faunal remains by taxa from 41BL991-B, Analysis Unit 1, Test Units 8 and 10 and Backhoe Trench 23

Provenience	Vertebrata	Medium/ Large Mammalia	Large/ Very Large Mammalia	*Bos / Bison*	*Bison bison*	Totals
TEST UNIT 8						
Level 9 (80–90 cm)	–	5	–	1	–	6
Level 10 (90–100 cm)	–	3	1	3	–	7
Level 11 (100–110 cm)	2	4	–	1	–	7
Subtotals	2	12	1	5	0	20
TEST UNIT 10						
Level 8 (70–80 cm)	–	1	–	–	–	1
Level 10 (90–100 cm)	9	2	–	1	–	12
Subtotals	9	3	0	1	0	13
BACKHOE TRENCH 23 (100 cm)	–	–	–	–	1*	1
Totals	11	15	1	6	1	34

* This specimen is a calcaneus. A portion of this bone was removed for radiocarbon dating.

Several unmodified animal bones were present in the C horizon between 80 and 110 cm in Test Units 8 and 10, and bone collagen extracted from a bison calcaneus produced a calibrated radiocarbon date (2-sigma range) of A.D. 1660–1950. Some bones represent medium (canid- to deer-sized) mammals, but six additional leg elements are identified as cattle or bison. These specimens are most likely bison based on their association with the calcaneus. Although the radiocarbon assay extends into modern times, the date can be refined to A.D. 1660–1886, a period when bison went from being very abundant to nearly extinct in Texas (Hornaday 1971). This would indicate that the deposit corresponds to the Protohistoric (contact) period. Although correlated to a cultural time period, the absence of associated prehistoric artifacts or definitive bone modification precludes the interpretation of the faunal assemblage as a result of human activity. The untyped dart point, found 30 cm higher than the concentration of animal bones, is out of stratigraphic context and probably represents additional evidence of disturbance to the upper deposits of Test Units 8 and 10.

Analysis Unit 2

Analysis Unit 2 consists of archeological remains found in the buried soils encountered in 12 of the 24 backhoe trenches and sampled in 8 of the 10 manual excavations. Artifacts associated with this buried paleosol were recovered from Backhoe Trenches 15, 21, 22, and 24. Although Analysis Unit 2 encompasses buried A and B horizons that are up to 75 cm thick, four dated features and most of the associated cultural materials are restricted to the Ab horizon. Analysis Unit 2 cultural materials were recovered from 60 to 140 cm below the surface.

Cultural Materials

Five levels were excavated for Test Unit 1, from 60 to 110 cm below the surface. Few cultural materials were present (Table 5.12).

Test Unit 2 produced stone artifacts, unmodified bones, burned rocks, and charcoal from 60 to 120 cm. About 57 percent of these cultural materials occurred at 90–100 cm and are associated with Feature 4, a hearth encountered at 75–93 cm (see Cultural Features). One flotation and four charcoal samples collected from the general level matrix between 80 and 100 cm produced *Quercus* and *Juglans* sp. wood.

Sparse to moderate amounts of cultural materials were recovered from six levels (60–120 cm) excavated from Test Unit 3. Feature 1,

Table 5.12. Summary of cultural materials from 41BL991-B, Analysis Unit 2, Test Units 1–7 and Backhoe Trenches 15, 21, 22, and 24

Provenience	Untyped Dart Points	Untypeable Dart Points	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Cobble Tool/ Chopper	Edge-modified Flakes	Cores	Tested Cobbles	Unmodified Debitage	Metate	Artifact Totals	Unmodifed Bones	Unmodified Mussel Shell	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1															
Level 7 (60–70 cm)	–	–	–	–	–	–	–	–	2	–	2	–	–	–	–
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	–	0	–	–	1	0.10
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	–	–	0	–	–	3	0.20
Subtotals	0	0	0	0	0	0	0	0	2	0	2	0	0	4	0.30
TEST UNIT 2															
Level 7 (60–70 cm)	–	1	–	–	–	–	–	–	6	–	7	–	–	6	0.25
Level 8 (70–80 cm)	–	–	1	–	–	–	–	–	8	–	9	–	–	26	3.00
Feature 4 (75–93 cm)	–	–	–	–	–	–	–	–	17	–	17	44	–	28	9.00
Levels 8/9 (75–90 cm)	–	–	–	–	–	–	–	–	8	–	8	12	–	5	2.25
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	17	–	17	2	–	30	7.50
Level 10 (90–100 cm)	–	1	–	1	1	–	–	–	172	–	175	13	–	44	5.00
Level 11 (100–110 cm)	1	–	–	–	–	1	–	–	32	–	34	1	–	13	1.50
Level 12 (110–120 cm)	–	–	1	–	–	1	–	–	4	–	6	–	–	2	0.25
Subtotals	1	2	2	1	1	2	0	0	264	0	273	72	0	154	28.75
TEST UNIT 3															
Level 7 (60–70 cm)	–	–	–	1	–	–	–	–	2	–	3	–	–	–	–
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	4	–	4	–	–	5	0.25
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	8	–	8	–	–	21	1.50
Feature 1 (82–110 cm)	1	–	–	–	–	1	–	–	49	–	51	220	1	149	69.50
Levels 9/10 (85–95 cm)	–	–	–	–	–	–	–	–	13	–	13	19	–	31	6.00
Level 10 (90–100 cm)	–	–	–	–	–	–	–	–	4	–	4	–	–	14	1.00
Level 11 (100–110 cm)	–	–	–	–	–	1	–	–	5	–	6	1	–	4	0.20
Level 12 (110–120 cm)	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–
Subtotals	1	0	0	1	0	2	0	0	86	0	90	240	1	224	78.45

Table 5.12, continued

Provenience	Untyped Dart Points	Untypeable Dart Points	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Cobble Tool/ Chopper	Edge-modified Flakes	Cores	Tested Cobbles	Unmodified Debitage	Metate	Artifact Totals	Unmodifed Bones	Unmodified Mussel Shell	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 4															
Level 5 (40–50 cm)	–	–	–	–	–	–	–	–	–	–	0	–	–	3	0.25
Feature 2 (45–70 cm)	–	–	–	–	–	–	–	–	6	1	7	1	–	54	23.00
Levels 5/6 (52–62 cm)	–	–	–	–	–	–	–	–	–	–	0	1	–	27	10.00
Level 6 (50–60 cm)	–	–	1	–	–	–	–	–	3	–	4	–	–	28	6.00
Level 7 (60–70 cm)	–	–	–	–	–	–	–	–	1	–	1	–	–	5	1.50
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	4	–	4	–	–	5	0.50
Subtotals	0	0	1	0	0	0	0	0	14	1	16	2	0	122	41.25
TEST UNIT 5															
Level 9 (80–90 cm)	–	–	1	–	–	–	–	–	6	–	7	–	–	4	0.25
Level 10 (90–100 cm)	–	1	–	–	–	–	1	–	12	–	14	4	–	34	11.00
Level 11 (100–110 cm)	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–
Subtotals	0	1	1	0	0	0	1	0	19	0	22	4	0	38	11.25
TEST UNIT 6															
Level 11 (100–110 cm)	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–
Level 12 (110–120 cm)	–	–	–	1	–	–	–	–	2	–	3	–	–	9	0.25
Feature 3 (120–135 cm)	–	–	–	–	–	–	–	–	4	–	4	–	–	17	10.50
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	95	–	95	–	–	22	8.50
Level 14 (130–140 cm)	–	–	–	–	–	–	–	–	10	–	10	–	–	5	1.50
Subtotals	0	0	0	1	0	0	0	0	112	0	113	0	0	53	20.75
TEST UNIT 7															
Level 12 (110–120 cm)	–	–	–	–	–	–	–	–	1	–	1	–	–	1	0.10
Level 13 (120–130 cm)	–	–	–	–	–	–	–	–	2	–	2	–	–	–	–
Level 15 (140–150 cm)	–	–	–	–	–	1	–	–	–	–	1	–	–	–	–
Levels 16–18 (150–180 cm)	–	–	–	–	–	–	–	–	–	–	0	–	–	4	0.65
Subtotals	0	0	0	0	0	1	0	0	3	0	4	0	0	5	0.75

Table 5.12, continued

Provenience	Untyped Dart Points	Untypeable Dart Points	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Cobble Tool/ Chopper	Edge-modified Flakes	Cores	Tested Cobbles	Unmodified Debitage	Metate	Artifact Totals	Unmodifed Bones	Unmodified Mussel Shell	Burned Rock Counts	Burned Rock Weights (kg)
BACKHOE TRENCHES															
Trench 15 (110–120 cm)	–	–	–	–	–	–	1	–	–	–	1	–	–	–	–
Trench 21 (50–80 cm)	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–
Trench 22 (75–95 cm)	–	–	1	–	–	–	–	–	–	–	1	–	–	–	–
Trench 24 (50–60 cm)	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–
Subtotals	0	0	1	0	0	0	1	2	0	0	4	0	0	0	0.00
Totals	2	3	5	3	1	5	2	2	500	1	524	318	1	600	181.50

a basin-shaped hearth, was present at 82–110 cm (see Cultural Features).

Three small burned rocks occurred at 40–50 cm in Test Unit 4, and Feature 2, a hearth, was encountered between 45 and 70 cm (see Cultural Features). The matrix around and below Feature 2 produced 1 early- to middle-stage biface, 8 flakes, and 38 burned rocks (8 kg).

Test Unit 5 yielded cultural materials from 80 to 110 cm, with most occurring at 90–100 cm. One flotation sample collected from Level 10 contained *Quercus* sp. wood.

Test Unit 6 was devoid of cultural materials from 80 to 100 cm, but a few stone artifacts and burned rocks were present from 100 to 120 cm. The top of Feature 3, a hearth, was exposed at 120 cm and extended to 135 cm (see Cultural Features). A concurrent increase in debitage and burned rocks occurred in the general level matrix around the hearth at 120–130 cm. Level 14 (130–140 cm) produced sparse cultural materials.

Six of seven levels excavated from 110 to 180 cm in Test Unit 7 yielded an edge-modified flake, 3 flakes, and 5 burned rocks (0.7 kg). No one level produced more than two items.

Additional artifacts collected from four different backhoe trenches are assigned to Analysis Unit 2. Recovered materials consist of 1 early- to middle-stage biface, 1 core, and 2 tested cobbles, along with one charcoal sample identified as *Quercus* sp. wood.

Cultural Features

Encountered from 82 to 110 cm in Test Unit 3, Feature 1 is a basin-shaped hearth or earth oven with maximum excavated dimensions of 112 cm north-south by 80 cm east-west (Figure 5.22). The hearth extended beyond the limits of the excavation, as burned rocks in the west wall indicated. Based on exposures in Test Unit 3 and Backhoe Trench 22, the hearth had estimated dimensions of 112 cm north-south by 160 cm east-west. Feature 1 was constructed of two to three layers of burned fossiliferous limestone (n = 149, 69.5 kg), with very few fractured in place. Several rocks sloped to the west toward the center of the feature, and some were vertical. About half were tabular pieces and slabs up to 35x20x5 cm in size, and the rest were fist-sized and smaller angular fragments. At the east-central margin of the feature, 10 large (10–35 cm in size) imbricated rocks occurred at generally higher elevations compared to the rest of the hearth. No charcoal was present among or under these rocks, whereas charcoal was observed underneath every other rock comprising the hearth. This concentration may represent rocks removed from another part of the hearth or dumped onto the hearth from elsewhere. There was a discrete 42x28-cm area of charcoal-stained sediment present at 100–110 cm near the center of the feature and adjoining the west wall of the test unit. One flotation sample collected from this stained area produced *Carya* sp. nutshells, along with wood of *Quercus*, *Celtis*, and *Juniperus* spp., Salicaceae, Rosaceae, and an indeterminate hardwood. Additional charcoal and flotation samples contained the same wood and nutshell taxa along with *Carya*, *Ulmus*, and *Rhus* spp. wood. The feature matrix contained 1 untyped dart point, 1 edge-modified flake, 49 flakes, 220 unmodified bones, and 1 unmodified *Leptodea fragilis* mussel shell. Four Cricetidae teeth, as well as 1 Mammalia and 215 Vertebrata fragments comprised the faunal assemblage. Of the 220 bones, 41 specimens exhibit evidence of burning, but none are spirally fractured. Identified as *Quercus* sp. wood, charcoal collected at 112 cm yielded a conventional radiocarbon date of 1060 ± 70 B.P. (Beta-153666). Aside from disturbance due to trenching, no other effects to Feature 1 were apparent.

At 85–95 cm, 23 burned rocks (5 kg) were concentrated within a 46x45-cm area just south of Feature 1. No patterning was apparent, and these rocks probably represent debris discarded from the hearth. Thirteen flakes and 14 unmodified Vertebrata bone fragments were recovered from this area, and unidentifiable charcoal flecks were noted in one flotation sample. Eight overlapping burned rocks and 5 unmodified Vertebrata fragments also were encountered at 87–95 cm in a 30 cm east-west by 10 cm north-south area located along, and extending into, the south wall of the Test Unit 3. Copious charcoal occurred beneath and below these burned rocks. These burned rocks may represent the edge of another hearth that is similar to Feature 1. Charcoal collected from this area yielded a conventional radiocarbon age of 690 ± 40 B.P. (Beta-153670); one flotation sample produced an indeterminate hardwood, Salicaceae, *Celtis* and *Quercus* sp. wood, and *Carya* sp. nutshells.

Table 5.12. Summary of cultural materials from 41BL991-B, Analysis Unit 2, Test Units 1–7 and Backhoe Trenches 15, 21, 22, and 24

Provenience	Untyped Dart Points	Untypeable Dart Points	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Cobble Tool/ Chopper	Edge-modified Flakes	Cores	Tested Cobbles	Unmodified Debitage	Metate	Artifact Totals	Unmodifed Bones	Unmodified Mussel Shell	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1															
Level 7 (60–70 cm)	–	–	–	–	–	–	–	–	2	–	2	–	–	–	–
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	–	–	0	–	–	1	0.10
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	–	–	0	–	–	3	0.20
Subtotals	0	0	0	0	0	0	0	0	2	0	2	0	0	4	0.30
TEST UNIT 2															
Level 7 (60–70 cm)	–	1	–	–	–	–	–	–	6	–	7	–	–	6	0.25
Level 8 (70–80 cm)	–	–	1	–	–	–	–	–	8	–	9	–	–	26	3.00
Feature 4 (75–93 cm)	–	–	–	–	–	–	–	–	17	–	17	44	–	28	9.00
Levels 8/9 (75–90 cm)	–	–	–	–	–	–	–	–	8	–	8	12	–	5	2.25
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	17	–	17	2	–	30	7.50
Level 10 (90–100 cm)	–	1	–	1	1	–	–	–	172	–	175	13	–	44	5.00
Level 11 (100–110 cm)	1	–	–	–	–	1	–	–	32	–	34	1	–	13	1.50
Level 12 (110–120 cm)	–	–	1	–	–	1	–	–	4	–	6	–	–	2	0.25
Subtotals	1	2	2	1	1	2	0	0	264	0	273	72	0	154	28.75
TEST UNIT 3															
Level 7 (60–70 cm)	–	–	–	1	–	–	–	–	2	–	3	–	–	–	–
Level 8 (70–80 cm)	–	–	–	–	–	–	–	–	4	–	4	–	–	5	0.25
Level 9 (80–90 cm)	–	–	–	–	–	–	–	–	8	–	8	–	–	21	1.50
Feature 1 (82–110 cm)	1	–	–	–	–	1	–	–	49	–	51	220	1	149	69.50
Levels 9/10 (85–95 cm)	–	–	–	–	–	–	–	–	13	–	13	19	–	31	6.00
Level 10 (90–100 cm)	–	–	–	–	–	–	–	–	4	–	4	–	–	14	1.00
Level 11 (100–110 cm)	–	–	–	–	–	1	–	–	5	–	6	1	–	4	0.20
Level 12 (110–120 cm)	–	–	–	–	–	–	–	–	1	–	1	–	–	–	–
Subtotals	1	0	0	1	0	2	0	0	86	0	90	240	1	224	78.45

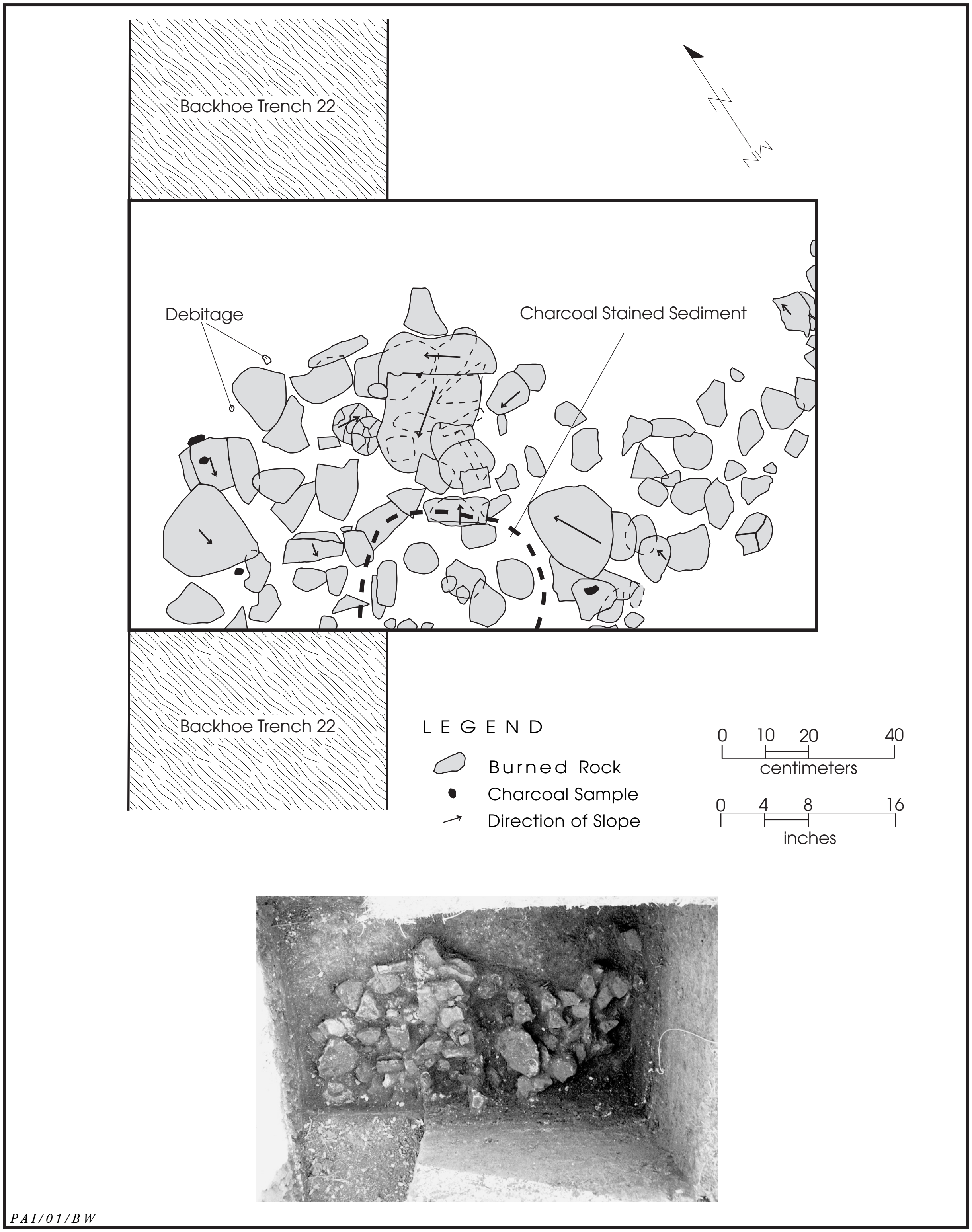

Figure 5.22. Plan and photograph of Feature 1 in Test Unit 3, 41BL991-B.

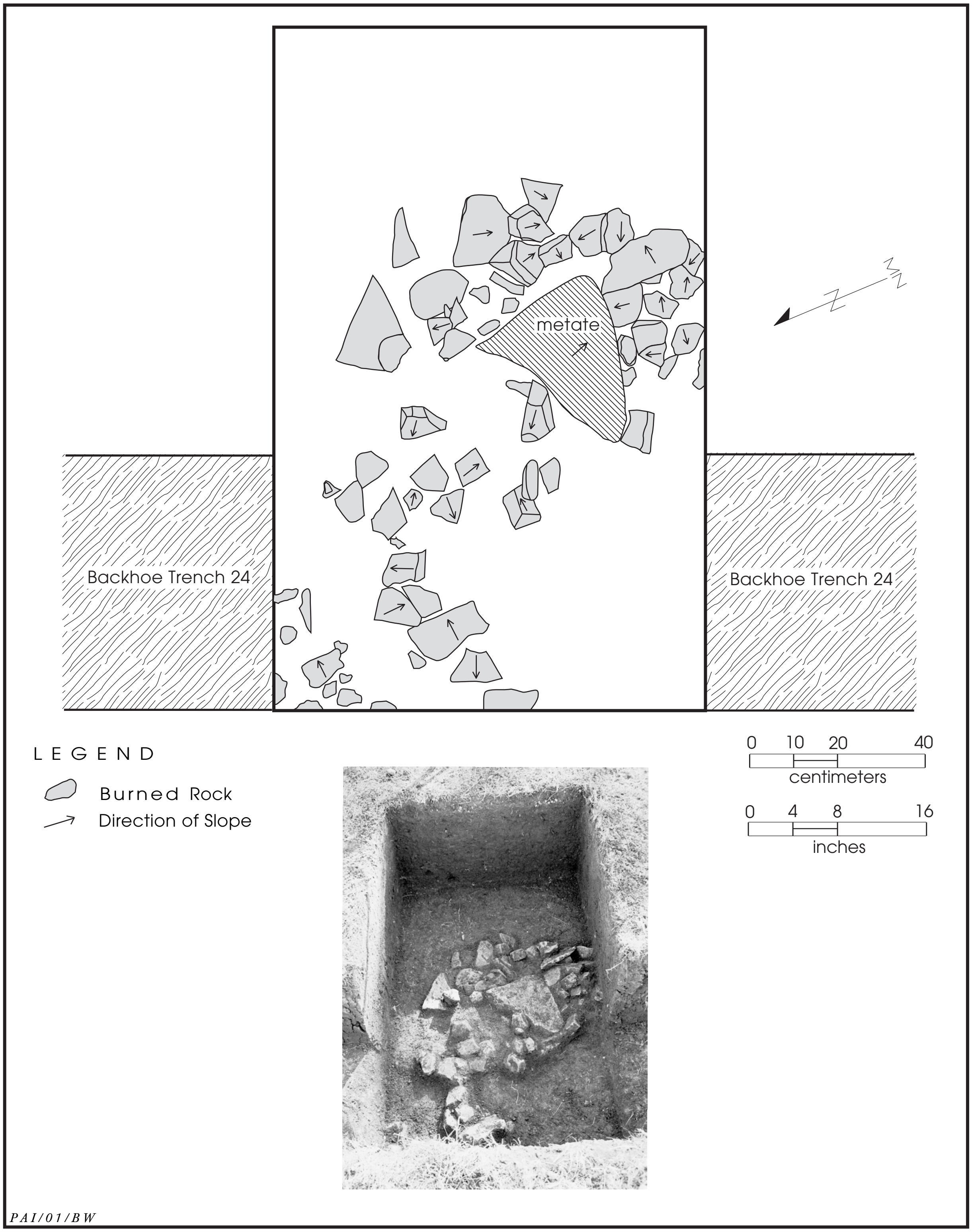

Figure 5.23. Plan and photograph of Feature 2 in Test Unit 4, 41BL991-B.

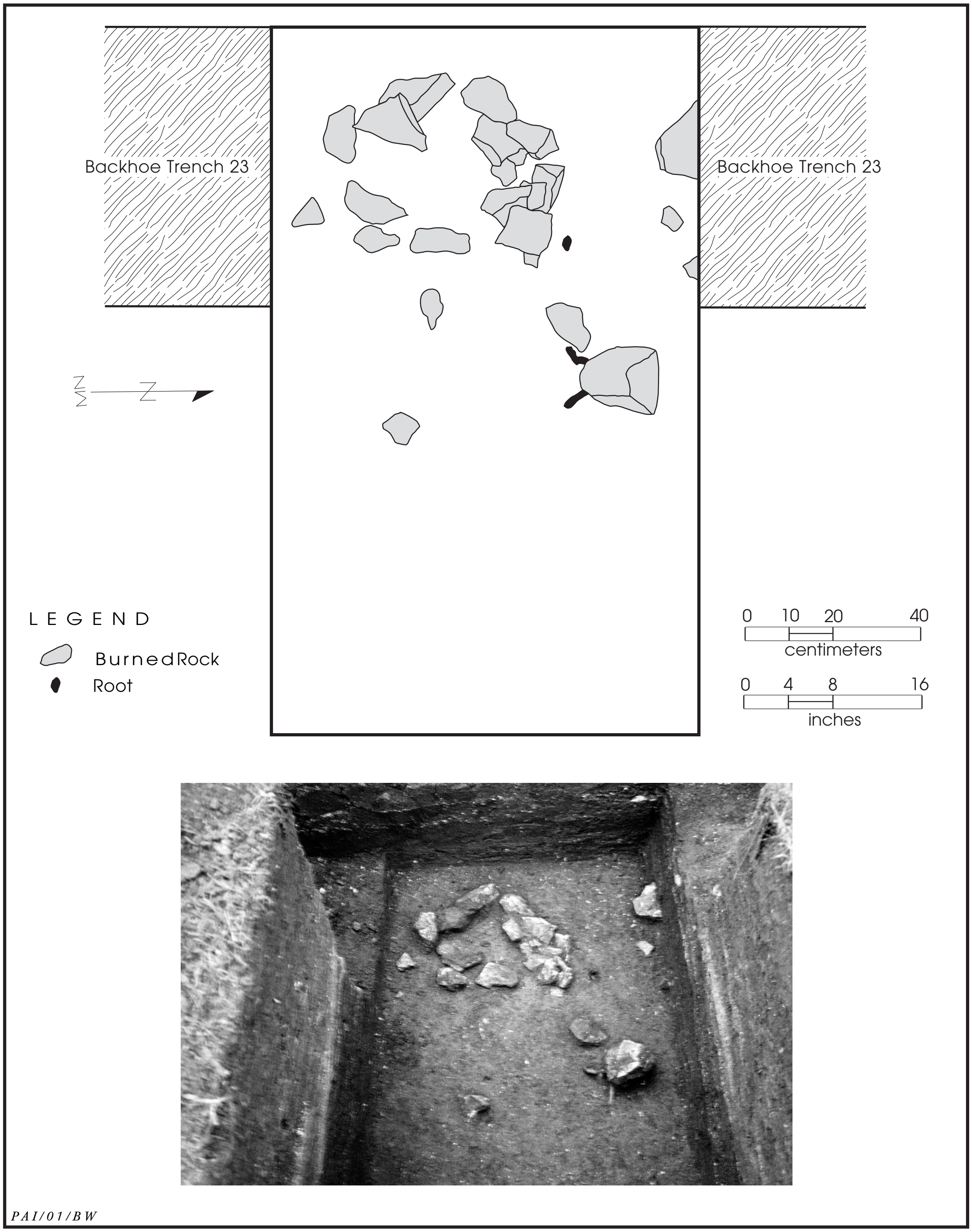

Figure 5.24. Plan and photograph of Feature 3 in Test Unit 6, 41BL991-B.

particularly the larger pit feature, which could be used for a variety of other types of cooking. Both features may also have been used over and over. Scattered burned rocks, probably representing clean out from the hearths, were found in association (i.e., at the same level and adjoining). Expedient and formal stone tools (including untyped and untypeable dart points), debitage, and faunal remains were found in and around the hearths. Approximately 15 m west of the features, similar types of cultural materials encapsulated within a 20-cm-thick deposit are associated with the hearths. In the vicinity of Features 1 and 4, charcoal obtained from a lens of burned rocks that extended beyond the limits of the excavation area produced a calibrated radiocarbon date (2-sigma range) of A.D. 1270–1390. Here, the concentration of burned rocks and presence of charred macrobotanical remains, including hickory shell fragments, mimic Feature 1. The density of charred organic remains in the small excavation samples is quite

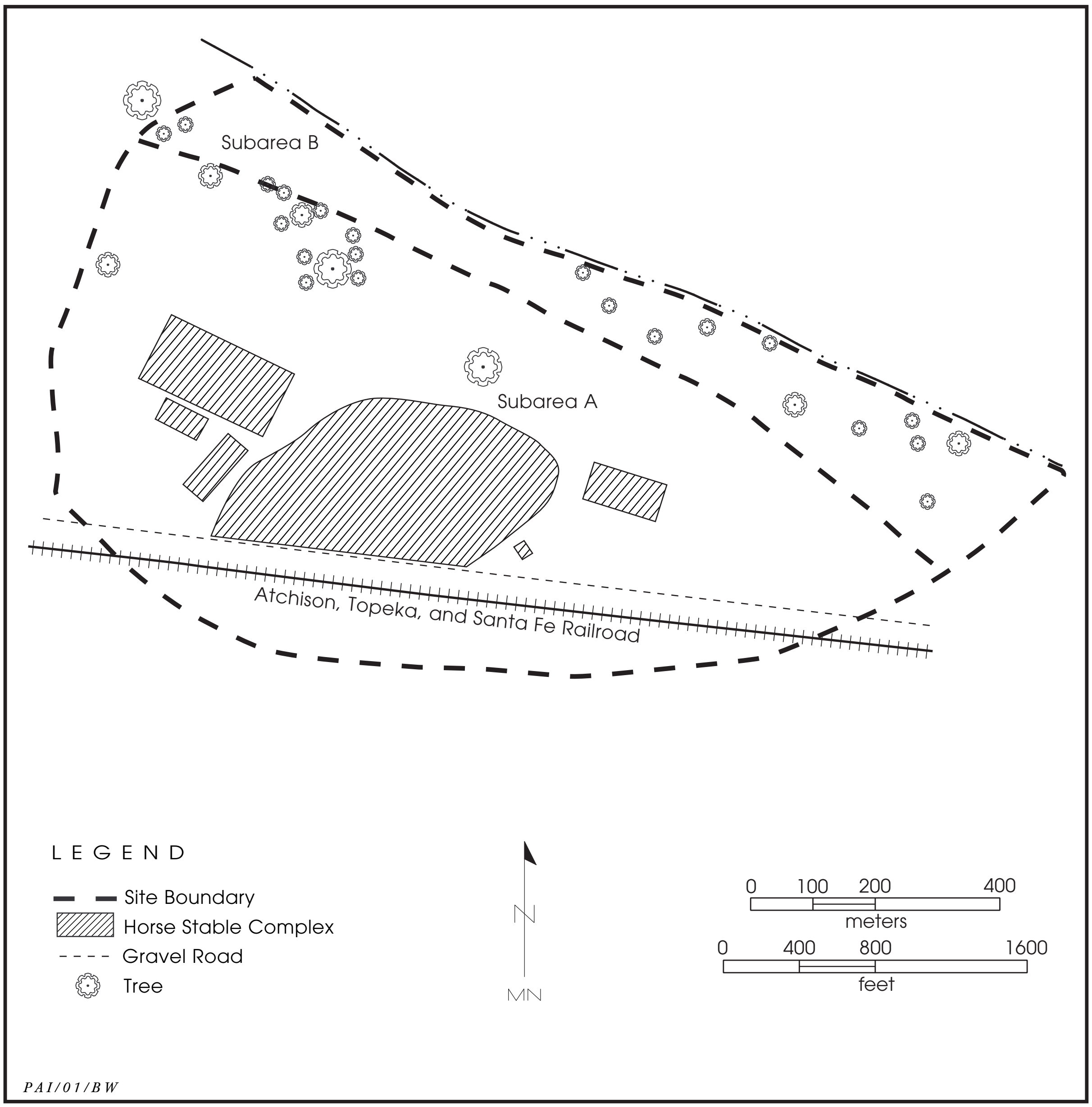

Figure 5.25. Plan and photograph of Feature 4 in Test Unit 2, 41BL991-B.

high: 0.24 liters of matrix sampled from this burned rock and charcoal lens produced 4.7 g of charred material as compared to 36.96 liters of fill from Feature 1 that contained 12.2 g of burned wood and nut shell.

Feature 2 is located 130 m northeast of where Features 1 and 4 were found, and Feature 3 is located 80 m east of the same area. These two hearths were located approximately 40 m apart but produced overlapping calibrated radiocarbon dates (2-sigma range) of A.D. 690–970 and A.D. 880–1010. These two hearths are different in morphology; Feature 2 (10,050 cm^2) is composed of a single layer of burned rocks in a shallow basin, but the much smaller Feature 3 (2,772 cm^2) has a flat base, one burned rock layer defining the hearth's perimeter, and a rock-free area at its center. Sparse cultural materials and minimal charred remains of oak and hickory wood are associated with Feature 2. A complete, unburned metate situated at the center of this hearth may represent a cached item. Burned rocks and debitage are the only cultural materials found with Feature 3; there are no identifiable macrobotanical materials.

Overall, the Analysis Unit 2 cultural assemblage consists of 19 chipped stone tools, 4 cores-tested cobbles, 500 flakes, a metate, 318 bones, and a mussel shell. Three of the five dart points have distal breaks consistent with impact damage from use as projectiles (as opposed to hafted cutting tools). The dart points may represent recycled artifacts, or the manufacture of dart points may have continued into the Austin phase. Five (62.5 percent) of eight bifaces are early- to middle-stage manufacturing failures or discards. Of the remaining three late-stage to finished bifaces, two exhibit lateral edge retouch and may have been used as cutting tools. Almost 84 percent (n = 417 of 500) pieces of debitage consist of noncortical flaking debris. Although most flakes (n = 336, 67.2 percent) are less than 0.5 inches in size, a substantial number (n = 164, 32.8 percent) are larger than 0.5 inches. A qualitative examination of debitage striking platforms reveals that many flakes larger than 1.0 inch exhibit cortical and single-facet platforms. Of the smaller flakes, many lipped and multi-faceted platforms were observed, as well as a few small, parallel-sided flakes with small lipped platforms. These observations suggest that a diversity of lithic reduction activities took place, including early-stage biface production, flake blank production, and middle- to late-stage biface production, as well as some finishing pressure retouch.

Of the 523 lithic artifacts, only two flakes and one early- to middle-stage biface could be identified to known chert types such as Fort Hood Yellow and Anderson Mountain Gray. The color and texture diversity within the cherts from indeterminate sources (n = 520, 99.4 percent) represents variability that would be encountered in upland lag-gravel and stream bedload environments. A qualitative examination reveals abraded as well as some polished cortex, suggesting raw material acquisition from bedload or lag-gravel sources.

The faunal assemblage is dominated by very small, unidentifiable fragments; however, rabbit, vole, and canid- to deer-sized mammals are represented. Of the 318 bones in the assemblage, only 6 (1.9 percent) are spirally fractured and 65 (20.4 percent) exhibit evidence of burning. Elm, hackberry, hickory, juniper, oak, sumac, walnut, and rose and willow family wood are identified from feature and nonfeature contexts. Charred hickory nut shell fragments indicate a processed food resource.

Analysis Unit 3

Analysis Unit 3 includes the West Range alluvium underlying the paleosol in the T_{1a}. A single archeological component may be buried at 190–210 cm (Table 5.13), but Test Unit 7 was the only unit excavated deep enough to sample this component. Sediments below the paleosol were observed in Backhoe Trenches 4, 7–9, 15–18, and 21–24 to a maximum depth of 310 cm. No cultural remains were observed in the 50–240-cm-thick lower deposits in these 12 trenches, but these deposits were not systematically sampled.

Cultural Materials

Analysis Unit 3 sediments were present in six test units (see Figure 5.21), but only four units produced cultural materials. Three units contained only minimal cultural evidence, but Test Unit 7 yielded Pedernales dart point, six flakes, and six burned rocks (0.5 kg) at 190–210 cm.

Table 5.13. Summary of cultural materials from 41BL991-B, Analysis Unit 3, Test Units 2, 4, 7, and 9

Provenience	Dart Point	Unmodified Debitage	Artifact Totals	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 2					
Level 13 (120–130 cm)	–	1	1	–	–
TEST UNIT 4					
Level 9 (80–90 cm)	–	–	–	1	0.10
TEST UNIT 7					
Level 20 (190–210 cm)	–	6	7	6	0.50
TEST UNIT 9					
Level 9 (80–90 cm)	–	–	–	1	0.10
Totals	1	7	8	8	0.70

Discussion

A slight peak in cultural materials occurred within a 20-cm-thick zone in Test Unit 7, but no other units were excavated deep enough to sample this zone. In Test Unit 7, the vertic soils are very well developed and exhibit cracks from shrink-and-swell processes, rendering the precise context of these cultural materials at ca. 2 m deep suspect. Nonetheless, the relative age of the West Range alluvium and the diagnostic dart point indicate that this cultural component dates to the Late Archaic period.

Summary and Conclusions

Although site 41BL991-B encompasses 78,125 m^2, dateable and stratigraphically discrete deposits are restricted to an 18,750-m^2 portion of the T_{1a} at the east end of the site. Excavations reveal that the area may have been used from the Late Archaic through Protohistoric periods, and three components are defined based on radiocarbon assays, temporally diagnostic artifacts, and alluvial stratigraphy (Table 5.14)

A Late Archaic component is deeply buried below the paleosol found throughout much of the T_{1a} (see Analysis Unit 3). This component remains poorly defined, however, and only one test unit reached this 20-cm-thick occupation zone buried at ca. 190–210 cm. These buried deposits appear to have a low density of artifacts, and the vertic soils at this depth display evidence of shrink-and-swell cracking that may have affected the archeological integrity of this occupation zone.

Intensive occupation during the Austin phase of the Late Prehistoric period (possibly beginning near the end of the Late Archaic period) is well established by radiocarbon assays spanning approximately 700 years from A.D. 690 to A.D. 1390 (see Analysis Unit 2). Archeological remains include intact features, a diverse and rich artifact assemblage, and an abundance of well-preserved charred organic remains. The Austin phase component is encapsulated within a distinct paleosol that formed on the West Range alluvium. This period of surface stability has been previously documented on Fort Hood in the Leon River and Henson Creek valleys, and the buried soil at 41BL991-B is coeval with the Tanktrail paleosol defined by Nordt (1995:211) and the Leon River paleosol defined by Mehalchick et al. (1999:213–215; Kleinbach et al. 1999:395).

Materials correlating to the Protohistoric period are mostly unmodified bones; these are confined to a small area around Backhoe Trench 23 (see Analysis Unit 1). The nature and integrity of these remains are unknown. Many of the bones are identified as bison or probable bison, and a radiocarbon date on one bone indicates that the deposits are no more than 1,450 years old and at least 110 years old (the approximate time when bison disappeared from central Texas). Although these bones probably represent a Protohistoric component—that is, a Native American site—the absence of associated artifacts and the lack of definitive human modifications make this interpretation tentative.

Based on the testing results, the eastern portion of 41BL991-B, encompassing an area 125 m north-south by 150 m east-west, is recommended as eligible for listing in the National Register.

41BL993-B

Site Setting

This large site encompasses the First Cavalry Division horse stable complex situated

Table 5.14. Summary of all cultural materials from 41BL991-B by time period

Time Period (Analytical Group)	Dart Points	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Cobble Tool/ Chopper	Edge-modified Flakes	Cores	Tested Cobbles	Unmodified Debitage	Metate	Artifact Totals	Unmodified Bones	Unmodified Mussel Shell	Burned Rock Counts	Burned Rock Weights (kg)
Protohistoric (AU 1)	1*	–	–	–	–	–	–	1	–	2	34	–	6	1.95
Late Archaic transitional into Austin Phase (AU 2)	5	5	3	1	5	2	2	500	1	524	318	1	600	181.50
Late Archaic (AU 3)	1	–	–	–	–	–	–	7	–	8	–	–	8	0.70
Totals	7	5	3	1	5	2	2	508	1	534	352	1	614	184.15

* Dart point found in disturbed deposits.

due north of Business Highway 190 (Veterans Memorial Boulevard) and just east of the Fort Hood Main Gate entrance (Figure 5.26). An unnamed tributary of South Nolan Creek delineates the northern site boundary. This well-maintained area supports short grasses along with isolated junipers and hardwood tree mottes. Disturbances include construction of the stable complex; the Atchison, Topeka, and Santa Fe Railroad; roads; and utility lines. Site elevation is 260–280 m above mean sea level.

Previous Work

Garza, Stocker, and Dureka (Texas A&M University) recorded the site on 5–6 December 1991 (Thoms 1993:95–96). This lithic procurement site consisted of tested cobbles, cores, debitage, spokeshaves, utilized flakes, burned rocks, scrapers, and bifaces; one scraper was collected. The site form also notes that during a pipeline survey in October 1987, Dureka and Mesrobian (Texas A&M University) collected a Late Archaic dart point stem from inside a horse corral. Maximum site dimensions were 1,290x360 m, but the northern site boundary was not clearly established because the area extended into adjacent, unsurveyed quadrants. At the northeast site margin, a buried core or chopper and a paleosol were observed in the tributary cutbank. The depth of deposits across the site was variable and ranged from 30 cm to greater than 2 m. Corral and stable construction, utilities, vehicles, erosion, and horse hoof damage disturbed an estimated 75 percent of the area.

In November 1999, the First Cavalry Division requested a digging permit to construct a small jump course. On 29 November 1999, Kleinbach (Fort Hood Cultural Resource Management Office) inspected the proposed dig areas and concluded that the portion of the site to be affected had no potential for intact cultural deposits because there were no Holocene deposits. The area was situated on the intermediate upland (Killeen) surface, and a 1938 aerial photo clearly revealed that the land was cultivated. The recommendation was to allow construction to proceed. Though it was clear that the upland where the jump course would be constructed contained no significant archeological deposits, an archeological investigation was needed to define realistic site boundaries, identify subareas based on geomorphic differences, and evaluate the research potentials of various subareas (site file, Kleinbach to Huckerby, 29 November 1999).

In April 2000, Kleinbach again visited the site to differentiate depositional areas with archeological potential (personal communication 2000). At this time, the site boundary was expanded north to the tributary, and maximum dimensions were defined as 1,300x650 m. After this visit, formal testing to determine National Register eligibility was recommended—25 backhoe trenches and 10 m^2 of manually excavated test units.

Work Performed

Geomorphic Reconnaissance

Mehalchick and Kibler (Prewitt and Associates) visited and evaluated the site on 11 October 2000. Because archeological potentials and geomorphic contexts differed, the site was divided into Subareas A and B. The site size noted in 2000 was not changed.

Subarea A subsumes the upland (Killeen) surface and Pleistocene terrace (T_2). Both landforms are severely eroded and deflated, with the surface of the Pleistocene terrace merging indistinguishably upslope with the upland. The surface of the T_2/upland complex ranges from 6 to 10 m above the channel of the unnamed tributary to the north. The surface sediments consist of a gravelly dark loam with chert lags. Although no subsurface exposures were observed, the eroded T_2 most likely correlates to the Jackson alluvium (Nordt 1992) based on its elevation. The area supports sporadic trees and a dense grass cover. Scattered lithic artifacts, along with sparse burned rocks and residual chert cobbles, were observed. Construction of the stable complex, utility lines, roads, vegetation clearing, agriculture, and erosion has extensively damaged the subarea. Because potential for intact subsurface cultural deposits was negligible, no further work was warranted for Subarea A.

The surface of the T_2/upland complex merges gently downslope with the lower (T_1) terrace. The T_1 surface, designated Subarea B, rises 2 m above the channel and is level to nearly level across the area, although the terrace margin is beveled. Surface sediments consist of a dark loam with some gravel. A few cutbank exposures

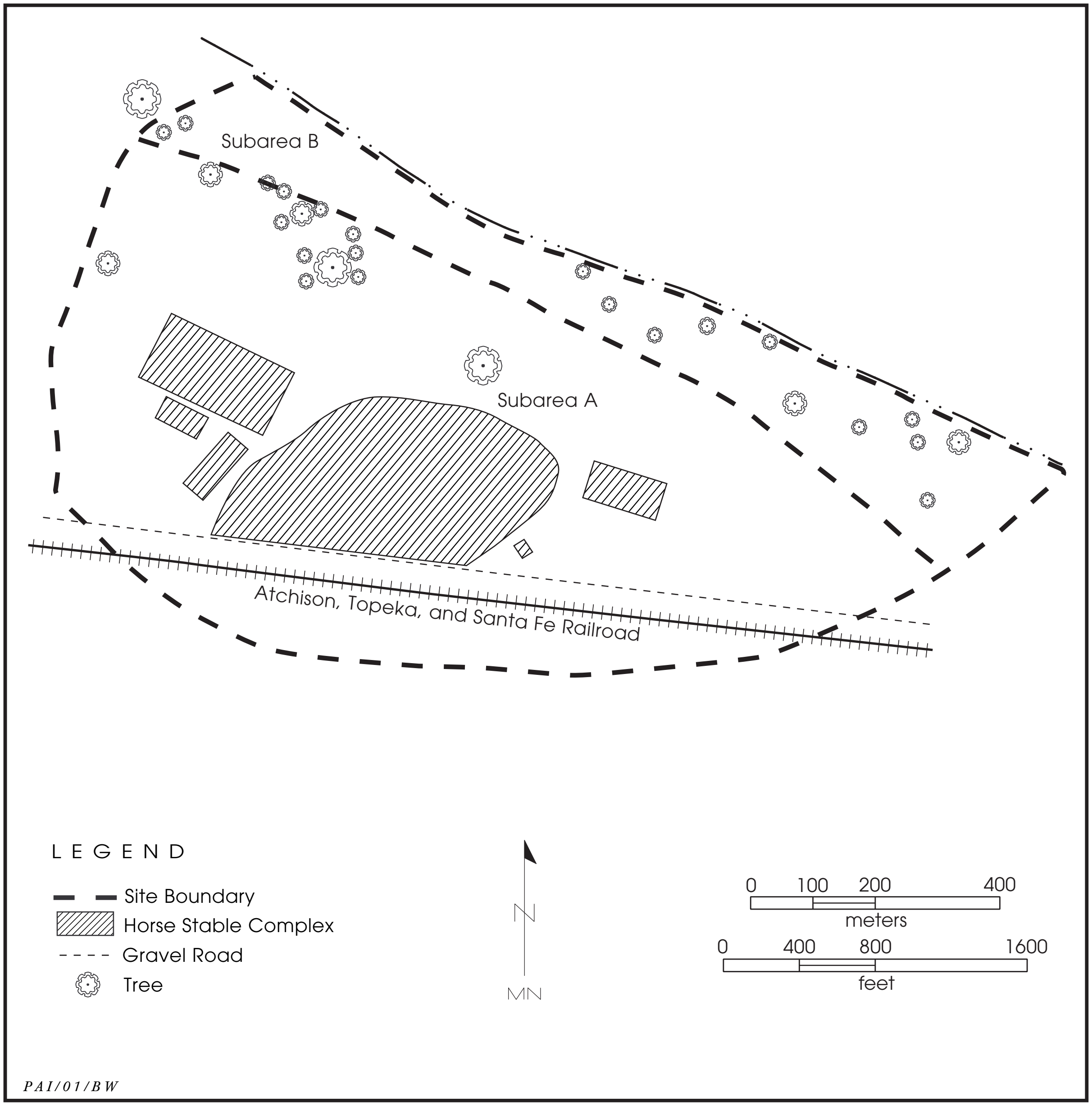

Figure 5.26. Site map of 41BL993 (modified from 2000 Fort Hood database aerial photo).

revealed up to 2 m of dark, loamy alluvium with gravel stringers and basal gravels. The deposits appear to correlate to West Range and Ford alluvium, and exhibit an A-Bw soil profile. The A horizon is a dark brown to gray loam underlain by a grayish brown clay loam Bw horizon. Vegetation consists of occasional hardwood trees and thick grasses. Sparse flakes were scattered across the surface, but the buried core or chopper noted in 1991 was not re-located. Horse traffic, construction of utility lines, flooding, and modification of the tributary channel (i.e., a narrow concrete culvert toward the west end of the subarea) have all disturbed the terrace. Based on the thickness of the Holocene-aged sediments and the potential for intact subsurface cultural deposits, formal testing was recommended for Subarea B.

Test Excavations

On 29 September 2000, Kleinbach (Fort Hood Cultural Resources Management Office) requested a digging permit so that excavations could be conducted at 41BL993-B. On 10 October 2000, Mehalchick (Prewitt and Associates) and Tofoya (Engineering Plans and Services-Utilities) visited the site to mark military utility lines. Two overhead transmission lines are present, and three underground water pipelines and one buried sewer line (above ground only where it crosses the tributary) traverse 41BL993-B. All four underground utility lines were marked on the aerial photo site map.

On 15 November 2000, formal testing of 41BL993-B was completed (Figure 5.27). The excavations consisted of 34 backhoe trenches (Backhoe Trenches 1–34) and 11 test units. Test Units 1–3 and 6–11 measured 1x1 m, and Test Units 4 and 5 measured 1.0x0.5 m. A total of 8.33 m^3 was manually excavated.

Thirty-four trenches were excavated across the T_1 surface beginning at the east end of the site and proceeding west. Twenty-four trenches were oriented on a general north-south axis perpendicular to the tributary, and the rest were aligned primarily east-west (Table 5.15). The trenches ranged from 6 to 22 m long and 0.3 to 2.5 m deep. Each trench was 0.7 m wide, excluding Backhoe Trench 33, which included a safety bench and had a maximum width of 2 m. Trench excavations were terminated when bedrock, Pleistocene-aged sediments, the channel bed, or the water table were encountered. All trenches were examined closely, but none exposed intact cultural materials. One flake found in a secondary context was observed at ca. 65 cm in Backhoe Trench 18. It was found in younger (Ford) alluvium representing swale deposits incised into older (West Range) sediments.

Test units were placed along backhoe trench walls or in mechanically scraped areas or were free standing. Test Units 1–5 were placed at the eastern end of the site in proximity to Backhoe Trenches 1, 2, and 5. The upper 50–80 cm of deposits were mechanically removed from Test Units 3–5 to facilitate access to buried soils or deeper deposits. Excavation of Test Units 1–3 was halted between 70 and 90 cm due to inundation from rain. Test Unit 4 encountered channel gravels at 130 cm, and Test Unit 5 was arbitrarily terminated at 150 cm. Test Unit 6 was situated approximately 4 m west of Backhoe Trench 28. The upper 18–25 cm of deposit (overburden) was removed by the backhoe. The unit was excavated to 100 cm, at which point channel bed deposits were encountered. Test Unit 7 was located just north of Backhoe Trench 30 in an area where the upper 40 cm of artificial fill and recent deposits was mechanically removed. The excavation was arbitrarily terminated at 150 cm. Along the west wall of Backhoe Trench 33, Test Unit 8 was placed in a mechanically scraped area adjoining the trench's safety bench, and Test Unit 9 was located on the safety bench. The backhoe removed the upper 34 and 90 cm of sediment from Test Units 8 and 9, respectively. The excavations were halted at arbitrary depths of 100 and 180 cm. Because Test Unit 1 was the only excavation that had produced prehistoric artifacts, Test Units 10 and 11 were placed in the same vicinity. The upper 25–33 cm of fill was manually removed from the two units but not screened. Both test units were excavated until channel gravels were encountered between 110 and 120 cm.

Site Extent and Depth

The long, Holocene-age terrace is situated between an unnamed tributary on the north and a denuded Pleistocene terrace to the south. Although the landform continues an unknown distance to the east and west, the investigations indicate that 41BL993-B has maximum dimensions of 1,175 m northwest-southeast by 150 m northeast-southwest. The near absence of prehistoric cultural materials indicates that no cultural components are present.

Sediments and Stratigraphy

The 145-cm-thick profile of Backhoe Trench 1 is capped by artificial fill or recent deposits from the surface to 41 cm. This recent mantle overlies West Range alluvium (41–145 cm), exhibiting an Ab-Bb-BCb soil profile. The Ab horizon (41–72 cm) is a very dark gray silty clay loam with 2 percent limestone gravels. The Bb horizon (72–100 cm) consists of a very dark gray silty clay loam with 10 percent limestone gravels. The BCb horizon (100–145 cm) is a grayish brown clay loam with 2 percent limestone gravels that rests on Walnut Formation limestone.

The Backhoe Trench 5 profile revealed West Range alluvium that displays an A-AB-Bw-Cox

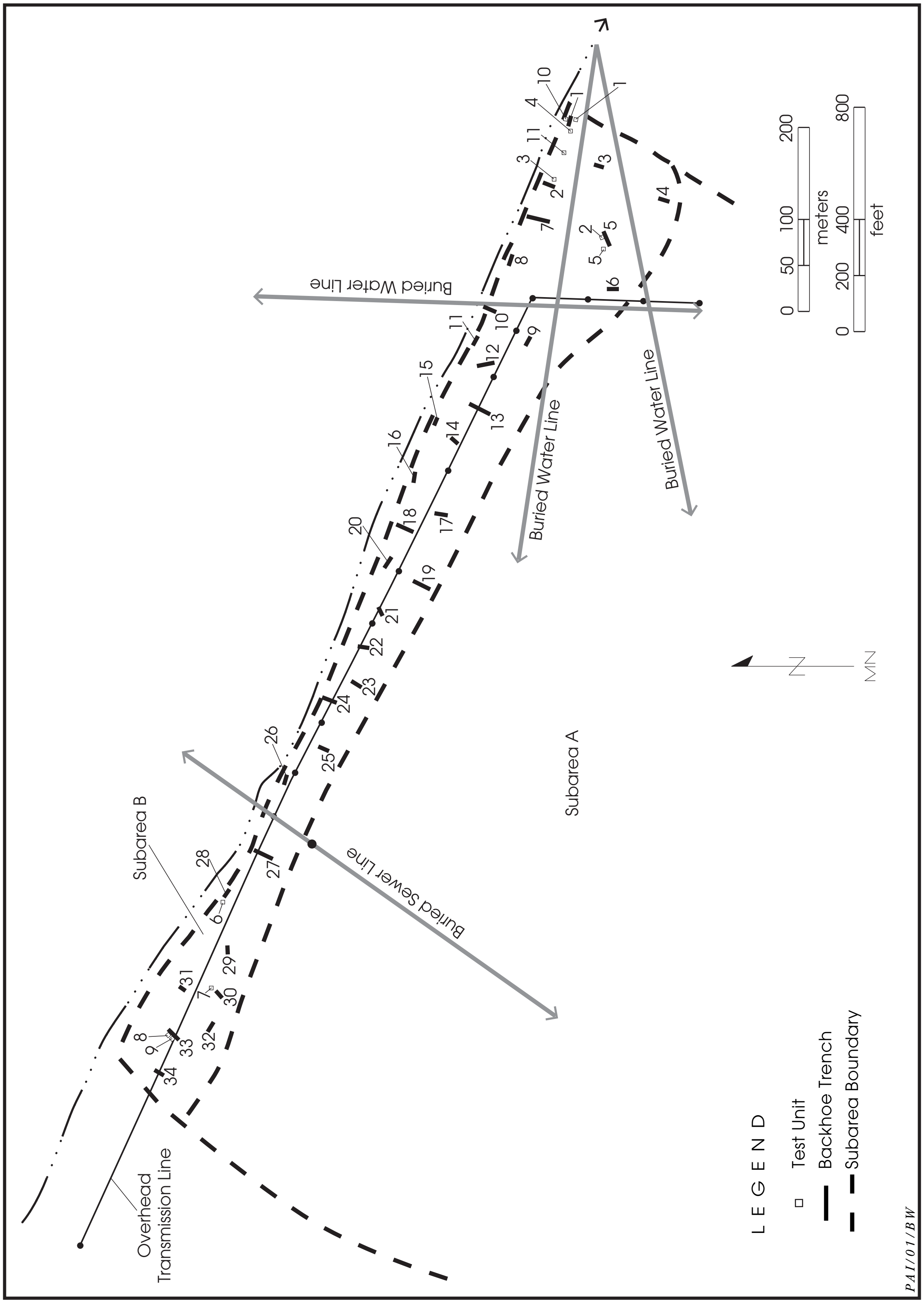

Figure 5.27. Site map of 41BL993-B.

Table 5.15. Backhoe trenches at 41BL993-B

Backhoe Trench	Maximum Dimensions (m)	Orientation	Backhoe Trench	Maximum Dimensions (m)	Orientation
1	7.0x0.7x1.5	100°	18*	13.0x0.7x2.3	12°
2	10.0x0.7x1.3	10°	19	16.0x0.7x1.4	15°
3	8.0x0.7x1.6	15°	20	6.5x0.7x2.3	100°
4	10.00x0.70x1.25	6°	21	6.50x0.70x2.45	58°
5	13.0x0.7x2.0	62°	22	8.0x0.7x1.6	10°
6	9.0x0.7x1.3	360°	23	8.0x0.7x1.1	20°
7	22.0x0.7x1.5	5°	24	12.0x0.7x1.9	20°
8	11.0x0.7x2.7	100°	25	6.50x0.70x1.15	10°
9	7.0x0.7x0.3	115°	26	5.00x0.70x1.15	85°
10	12.0x0.7x2.0	10°	27	18.5x0.7x1.6	16°
11	6.0x0.7x2.0	106°	28	8.50x0.70x1.25	300°
12	15.0x0.7x1.8	350°	29	8.0x0.7x2.0	75°
13	17.0x0.7x1.5	12°	30	8.0x0.7x1.4	30°
14	6.5x0.7x1.7	40°	31	3.0x0.7x2.0	20°
15	6.5x0.7x2.2	100°	32	10.5x0.7x1.9	105°
16	9.00x0.70x2.05	108°	33	20.0x2.0x2.1	30°
17	9.5x0.7x2.5	3°	34	10.5x0.7x2.5	16°

* Redeposited flake recovered at 65 cm in slough/gully fill.

soil profile. The A horizon (0–27 cm) is a very dark gray clay loam with 5 percent limestone gravels, and the AB horizon (27–99 cm) is a very dark gray clay loam with 10 percent limestone gravels. The Bw horizon (99–160 cm) consists of a dark grayish brown clay loam with 5 percent limestone gravels, whereas the Cox horizon (160–183+ cm) is a mottled light yellowish brown and very pale brown silty clay loam.

The 116-cm-thick profile of Backhoe Trench 17 consists of Ford alluvium and slopewash (0–70 cm) and West Range alluvium (70–116+ cm). These deposits are imprinted with an AC-2Btb soil profile. The AC horizon (0–70 cm) is a very dark gray clay loam with 25 percent limestone gravels. The 2Btb horizon (70–116+ cm) is comprised of a very dark gray clay loam with 5–10 percent limestone gravels. The gravel content increases to 50 percent at the base of this zone and is in the form of very thin gravel beds.

The profile of Backhoe Trench 18 consists of Ford alluvium and slopewash (0–69 cm), and West Range alluvium (69–205+ cm). These deposits are imprinted with an Ap-Bw-2Btb-2Btb2-2C soil profile. The Ap horizon (0–24 cm) is a dark gray clay loam with 25 percent limestone gravels. The Bw horizon (24–69 cm) is a very dark grayish brown clay loam with 10 percent limestone gravels. The 2Btb horizon (69–114 cm) is a dark gray clay with 5 percent limestone gravels, and the 2Btb2 horizon (114–165 cm) is a very dark gray clay loam with 5 percent limestone gravels. The 2C horizon (165–205+ cm) consists of rounded, clast-supported gravels.

The 127-cm-thick profile at the southern end of Backhoe Trench 19 consists of late Pleistocene Jackson alluvium. The deposits exhibit an A-B-B2 soil profile. The A horizon (0–21 cm) is a very dark gray silty clay loam with 2 percent limestone gravels. The B horizon (21–74 cm) is a brown clay loam with 2 percent limestone gravels, and the B2 horizon (74–127 cm) is a brown clay loam with 20 percent limestone gravels. Limestone bedrock of the Walnut Formation is exposed at 127 cm.

Artificial fill or recent deposits (0–136 cm) underlain by West Range alluvium (136–228+ cm) mantle the 228-cm-thick profile of Backhoe Trench 21. The upper alluvial deposits consist of a very dark gray clay loam with 2 percent limestone gravels and are imprinted with an A horizon (136–157 cm). The underlying C horizon (157–228+ cm) is comprised of rounded, clast-supported gravels.

Cultural Materials

A total of 85 levels were excavated from 11 test units; a tested cobble and a flake occurred at 30–50 cm in Test Unit 1. Test Unit 2 contained a railroad spike at 0–10 cm.

Discussion

Across much of 41BL993-B, the upper 20–140 cm of terrace deposits consist of artificial fill—possibly brought in to level portions of the terrace—or recent flood deposits that have no potential for containing intact cultural remains. Although certain portions of the terrace exhibit buried soils, particularly near the eastern site boundary, prehistoric artifacts within these deposits are extremely sparse. The abundance of gravels throughout the alluvial deposits also indicates high energy deposition—a depositional environment where cultural materials are likely to be in a secondary (redeposited) context and poorly preserved if present at all. Based on the testing results, 41BL993-B is recommended as not eligible for listing in the National Register.

41BL1039-B

Site Setting

This large site was named the Girl Scout Camp in 1993 because Camp Finlayson is within the site boundary (Figure 5.28). Clear Creek demarcates the east and south boundaries, and paved roads border the site to the north and west. Two-track roads, along with overhead and underground utility lines, cross the area. Much of the site has been cleared and supports grasses and juniper trees. At the southeast site margin, vegetation on the terrace consists of mixed riparian hardwoods with an open understory. Site elevation is 290–300 m above mean sea level.

Previous Work

Dix (Fort Hood Archeological Society) first recorded the site as 41BL152 on 3 May 1973. Measuring 200x100 m, this occupation site was situated on the west bank of Clear Creek. Debitage, burned rocks, manos, and metates were observed, and one metate fragment and several projectile points were collected. A chert resource was noted on Crossville Mountain, located just east of the creek and site area. Although the site's surface was disturbed, primarily from plowing, researchers noted "the lower levels still may contain valuable archeological data."

On 3 May 1973, Thomas (Fort Hood Archeological Society) analyzed the artifacts collected from 41BL152. The six collected dart points were typed as a possible Ensor, a Darl or Uvalde, two untyped, and two Pedernales. One burned piece of fossiliferous limestone was classified as a metate fragment with two circular depressions. Several years later, Thomas (1978) published an article on Fort Hood archeology in which he illustrated several Late Archaic points from 41BL152 (see Figure 3c, Ensor; Figure 3f, Darl-like; Figure 3m, Castroville; and Figures 4i and 4j, Pedernales). No site-specific information was provided in the article.

On 21 October 1993, Ellis and Frederick (Mariah Associates) visited the area (Trierweiler, ed. 1994:A601). They believed that the area represented an unrecorded site because no site maps or records for 41BL152 were found at the Fort Hood Cultural Resource Management Office or the Texas Archeological Research Laboratory (TARL). Designated 41BL1039, the site appeared to be very large and consisted of geomorphic landforms that were poorly understood at Fort Hood.

On 26 October 1993, Ellis, Frederick, and Dahlberg (Mariah Associates) revisited the area to conduct survey transects to delineate site boundaries (Trierweiler, ed. 1994:A601–A606). This large site (800x600 m) was classified as a Lithic Resource Procurement Area because of its size and the presence of a chert resource. The site's northern and western boundaries were not well defined, but existing paved roads were designated as site boundaries for management purposes. Possible lithic artifacts were noted to the north across Pump Station Road (or Copperas Cove Road), but it was unclear if this area was contiguous with the site. Clarke Road was defined as the western site boundary because "the low density of cultural materials visible on the west side of the site did not warrant attempting to extend the boundary across the road" (Trierweiler, ed. 1994:A601). A locked fence around a Girl Scout camp and recreational facility (maintained and in use) was noted at the north-central portion of the site.

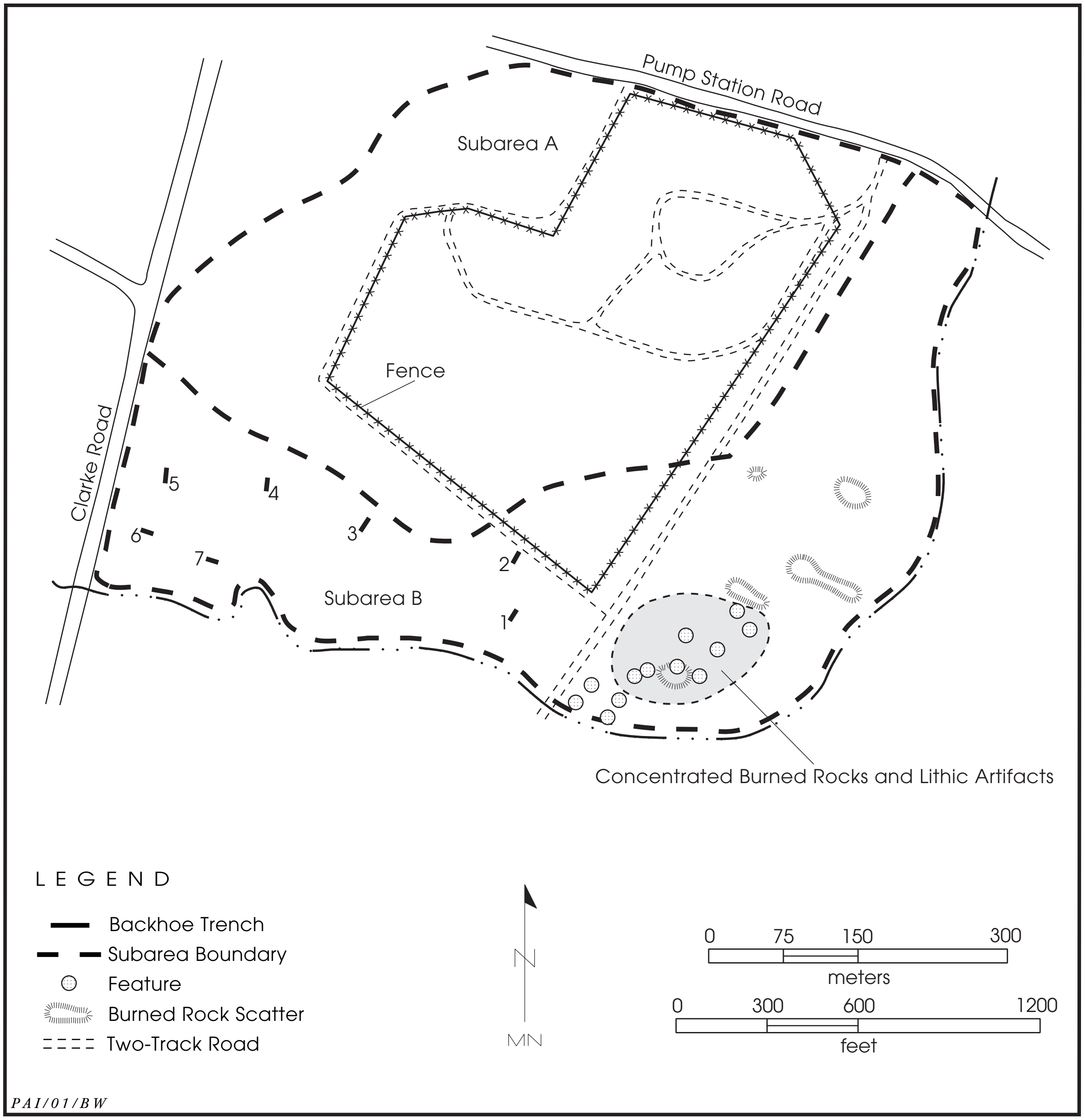

Figure 5.28. Site map of 41BL1039 (modified from a 1993 site map by Mariah Associates).

This section of the site was not inspected because there was no access to it.

Because archeological potentials and geomorphic contexts differed, the site was divided into Subareas A and B. The boundary between the two areas was not well defined, and researchers noted that it was possible that further investigations might differentiate additional subareas. Much of the fenced area encompassing the Girl Scout camp, a narrow strip along the southern fence line, and the area between the western fence line and Clarke Road subsumed an upland surface (Subarea A). Cultural materials were scattered sparsely across the surface, but very few artifacts were observed near the northwest margin of the subarea. Chert was present as a sparse lag deposit on the upland and within the bedload of

Clear Creek. A historic occupation was noted in the southwestern portion of the upland, approximately 20 m south of the southwest fence line corner. A house foundation, at least one cistern, and historic artifacts were apparent, but the component was not recorded as a historic site at that time. In this area, a small drainage appeared to have been dammed, and rock retaining walls were observed along Clear Creek. Ubiquitous vegetation clearing, cultivation, contour terracing, and erosion, along with the historic component and construction of the Girl Scout camp, had severely damaged Subarea A. Because Subarea A had negligible potential for intact subsurface cultural deposits, no further work was warranted.

At the southwest corner of the site, the upland (Subarea A) sloped down to a Pleistocene terrace (T_2), which sloped down imperceptibly to the Holocene terrace (T_1) of Clear Creek. The alluvial terraces constituting the remainder of the site were designated Subarea B. The Pleistocene terrace pinched out against the upland scarp near the southeast corner of the camp, but it was unclear if the terrace was expressed on the east side of the site. The extent to which the southeast and east portions of the site were characterized by colluvial or alluvial deposits, or an interfingering of the two, was unknown, nor could the full extent of the Holocene-age deposits be accurately interpreted. Extensive surface disturbance, poor visibility, a lack of subsurface exposures, and the absence of comparable geomorphic studies within the Clear Creek drainage basin hampered identification of the fills.

In Subarea B, lithic artifacts and burned rocks ranged from extremely sparse near the southwest and northeast margins to very dense in the southeast section. Burned rock concentrations and stone artifacts were especially conspicuous in the far southeast corner where borrow pit excavation, sheet and rill erosion, and sparse vegetation had created a 125x125-m area with high surface visibility. This area was described as a hearth field, and some of the concentrations were thought to be intact features that were partially exposed by cultivation, erosion, and blading or borrow activities. “However, many of these concentrations could not be confidently identified as intact features because it could not be determined whether or not they represented burned rocks redistributed by the blading-borrowing or by plowing” (Trierweiler, ed. 1998:A604). One large concentration also was considered to be a possible burned rock midden, but identification was problematic “because the surface pattern of rocks resembles the results of plow disturbance” (Trierweiler, ed. 1998:A604). A possible Ensor dart point was surface collected just north of the hearth field. The fills represented in this portion of the subarea could not be identified based on surface evidence. Researchers noted that cultural materials might be associated with a palimpsest surface (i.e. an ancient stable surface) that was severely reworked by cultivation and erosion or contained within intact Holocene-age alluvial deposits.

Subarea B was extensively disturbed by cultivation. Where surface visibility was the highest, sheet and rill erosion led to further damage. Parallel to the camp’s east fence line, a two-track road and overhead transmission line had disturbed the area. Also, there was evidence that a long trench had been excavated along the two-track road. Where the road crossed Clear Creek, there appeared to be an underground pipeline and associated blading and borrowing.

On 16 November 1993, Frederick (Mariah Associates) conducted limited backhoe trenching in lieu of shovel testing to clarify the geomorphology and archeological potential of Subarea B (Trierweiler, ed. 1998:A601). At the request of the Fort Hood Cultural Resource Management Office, trenching was limited to the western portion of the site because a power line was reportedly buried in the eastern portion. Seven backhoe trenches were excavated in the western section of Subarea B south of the Girl Scout camp fence. Four backhoe trenches were placed on the T_1 (Backhoe Trenches 1, 2, 6, and 7), and three trenches were located on the Pleistocene terrace (Backhoe Trenches 3–5). None of the trenches encountered cultural materials.

The trenches excavated on the T_1 surface were 70–260 cm deep and encountered bedrock or muddy gravels. The profiles varied widely, although each revealed a 10–30-cm-thick plow zone at the surface. The deposits in Backhoe Trench 2 were tenuously identified as West Range alluvium (Nordt 1992), but no other deposits could be linked to known depositional or temporal units.

Situated on the T_2, three trenches ranged in depth from 180 cm to more than 290 cm and were terminated at bedrock or dense gravels.

Backhoe Trench 3 exhibited an Ap-Bss-Btss-Bk-Bk2ss-Bk3 profile. The upper 270 cm of deposits consisted of silty clays and clays grading into a muddy sandy gravel at 270–290+ cm. Encountering bedrock at 160 cm, Backhoe Trench 4 revealed an Ap-Bss-Bss2-Bk-K profile. These deposits represented a sandy facies of the same unit exposed in Backhoe Trench 3. The age of the sediments was unknown, but were possibly equivalent to, or older than, Fort Hood alluvium.

Although trenching did little to clarify the site's geomorphology, thick Holocene-age deposits were revealed in some of the Subarea B excavations. Researchers noted that these sediments had the potential to contain intact subsurface cultural deposits and warranted further work. For Subarea B, the recommended testing to determine National Register eligibility consisted of 20–25 backhoe trenches (Trierweiler, ed. 1994:A605–A606).

On 21 December 1999, after an in-depth records search and field inspection, Kleinbach (Fort Hood Cultural Resource Management Office) determined that 41BL152 was plotted incorrectly on the Fort Hood master set of topographic maps. The original (1973) site records and map clearly indicated that the site was in a field west of Clear Creek, but it had been plotted east of the creek. When the site location was corrected, 41BL152 was found to be completely within 41BL1039-B. The latter number was chosen to represent the site (41BL152 was discontinued) because the recent investigations by Mariah Associates relate to the entire site and use 41BL1039, and the only published reference to 41BL152 is from 1978 (Thomas 1978) and presents no detailed site information.

In April 2000, Kleinbach visited the site to differentiate depositional areas with archeological potential (personal communication 2000). After this visit, formal testing to determine National Register eligibility of 41BL1039-B was recommended, consisting of 20 backhoe trenches and 8 m^2 of manually excavated test units.

Work Performed

On 29 September 2000, Kleinbach (Fort Hood Cultural Resource Management Office) requested a digging permit so that excavations could proceed at 41BL1039-B. On 15 November 2000, Mehalchick (Prewitt and Associates) and Tofoya (Engineering Plans and Services-Utilities) visited the site to mark any military utility lines. One overhead transmission line was apparent. Two underground water lines are located between the eastern camp fence line and the adjacent two-track road. Two buried gas lines, one active and one inactive, are located just east of the two-track road. All four underground utility lines were marked on the aerial photo site map.

On 15 November 2000, Mehalchick (Prewitt and Associates) conducted a reconnaissance survey of 41BL1039-B; overall site dimensions established in 1993 were not changed. Based on a close inspection of topography and landforms, it appeared that at least 60 percent of Subarea B consisted of the higher, Pleistocene terrace rather than the T_1. Relatively dense amounts of lithic artifacts and burned rocks were observed on this surface; this was particularly evident on the southeastern half of the T_2, which included the 125x125-m area of concentrated materials observed in 1993. Four typed dart points—Gower, Martindale, Pedernales, and Uvalde—as well as two untyped dart points were collected from the Pleistocene terrace surface. The historic component noted in 1993 was re-located. The house foundation and steps, constructed of cement and machine-made bricks, and various historic artifacts were observed. The Fort Hood Cultural Resource Management Office was informed of this unrecorded component, and Bandy visited and assessed the historic component on 17 November 2000. Very sparse prehistoric cultural materials were observed on the T_1/T_0 complex, and no archeological remains were observed in the Clear Creek cutbank.

Overall, Subarea B (particularly the T_2) was intensively and extensively disturbed by vegetation clearing, cultivation, contour terracing, borrow activity, two-track roads, utility construction, blading, a small stock pond, historic occupation, and erosion. An east-west berm, situated on the T_1 and adjoining and paralleling Clear Creek, also was visible from west of the buried pipelines to the western site boundary. A section of the T_1 (ca. 50x40 m) at the southeast corner of the site supported a dense riparian cover of various hardwoods and a thick understory and appeared to be the least-disturbed portion of the site.

On 9 January 2001, formal testing of 41BL1039-B was completed (Figure 5.29). Because Mariah Associates had excavated Backhoe Trenches 1–7 in 1993, the sequence began with Backhoe Trench 8. The excavations consisted of 25 backhoe trenches (Backhoe Trenches 8–32) and 11 test units, all 1x1 m (Test Units 1–11). A total of 9.33 m^3 was manually excavated.

Trenching began at the southeast site margin and proceeded northward, with Backhoe Trenches 8–27 excavated in this area. Trench 28 was placed just west of the underground utility lines where they crossed Clear Creek. The remaining four trenches (Backhoe Trenches 29–32) were spaced between Trench 28 and the western site boundary. Backhoe Trench 11 was situated on the Pleistocene terrace, Backhoe Trenches 10, 23, and 28 were located on the interface of the Pleistocene and Holocene terraces, and the rest were excavated on the T_1 or crossed the T_1/T_0 surfaces (Table 5.16). Fifteen trenches were oriented along a north-south axis, and the rest were aligned primarily east-west. Most were excavated perpendicular to Clear Creek, and the trenches ranged from 4.5 to 25.0 m long, were 0.7 m wide, and 1.0 to 2.8 m deep. Burned rocks were exposed in Backhoe Trenches 16, 22, 28, and 31. The context of the materials observed in Backhoe Trench 16 was unclear, but the burned rocks in the other three trenches were found in disturbed sediments or were redeposited.

Test units were placed in mechanically scraped areas, near backfilled trenches, or in isolated locations. Just east of the buried utility lines and a few meters north of Clear Creek, Test Unit 1 was placed on the Pleistocene terrace where scattered burned rocks were exposed on the surface. The excavation was terminated at 50 cm after Pleistocene sediments were encountered from 45 to 50 cm. Also situated on the T_2, Test Unit 2 was placed in an area of dense, surficial cultural materials. Pleistocene deposits were encountered between 15 and 20 cm, and the excavation was halted. Test Unit 3 was located on a narrow segment of the T_1 about 2 m west of Clear Creek. The excavation terminated at 100 cm near the top of the channel bed. At the southeast site margin, Test Unit 4 was placed on the section of the T_1 that supported dense vegetation. The excavation ended when the water table was encountered at 150 cm. Situated on the T_1 approximately 10 m west of Clear Creek, Test Units 5–9 were excavated near Backhoe Trench 16 (see Figure 5.29). This trench encountered a 3-m-long lens of burned and unburned rocks in dubious context at 40–50 cm. Terminated at 130 cm when the water table was reached, Test Unit 5 was placed just south of Backhoe Trench 16. Hitting the water table at 130 cm, Test Unit 6 was located 5–7 m southwest of Test Unit 5. Arbitrarily excavated to 100 cm, Test Unit 7 was placed diagonal to the southwest corner of Test Unit 5. Contiguous Test Units 8 and 9 were placed just north of Backhoe Trench 16 and ca. 1 m north of Test Unit 5. The units were arbitrarily terminated at 50 and 70 cm, respectively. On the T_1, Test Units 10 and 11 were contiguous units placed within a mechanically scraped area a few meters south of Backhoe Trench 21 (see Figure 5.29). The upper 40–42 cm of deposits in both units was removed by the backhoe. The excavations were halted at dense gravels between 90 and 110 cm. In Test Unit 10, only the northwest quadrant of the unit was excavated at 100–110 cm.

Site Extent and Depth

Clear Creek and the upland surface delimited the terraces to the south, east, and northwest. Although a portion of the northern and all of the western boundaries are arbitrarily defined by paved roads, the terraces continue an unknown distance in these directions. Based on past and previous investigations, 41BL1039-B measures 660 m northwest-southeast by 640 m northeast-southwest. Because disturbances were extensive and subsurface prehistoric materials were sparse, no intact cultural components were identified.

Sediments and Stratigraphy

Based on the stratigraphic exposures provided by the 25 backhoe trenches, the approximate location of the interface between the Pleistocene T_2 and Holocene T_1 was mapped (Figure 5.30). Eleven backhoe trench and test unit profiles were described in Appendix B, but only selected profiles are discussed below. The T_1 stratigraphy was exposed in Backhoe Trenches 8, 9, 12–22, and 24–32. The T_1 sediments consist of interbedded silty overbank and gravelly channel alluvium.

Based on landform position, interbedded stratigraphy, and soil morphology, it appears that the T_1 sediments correlate to the Ford and

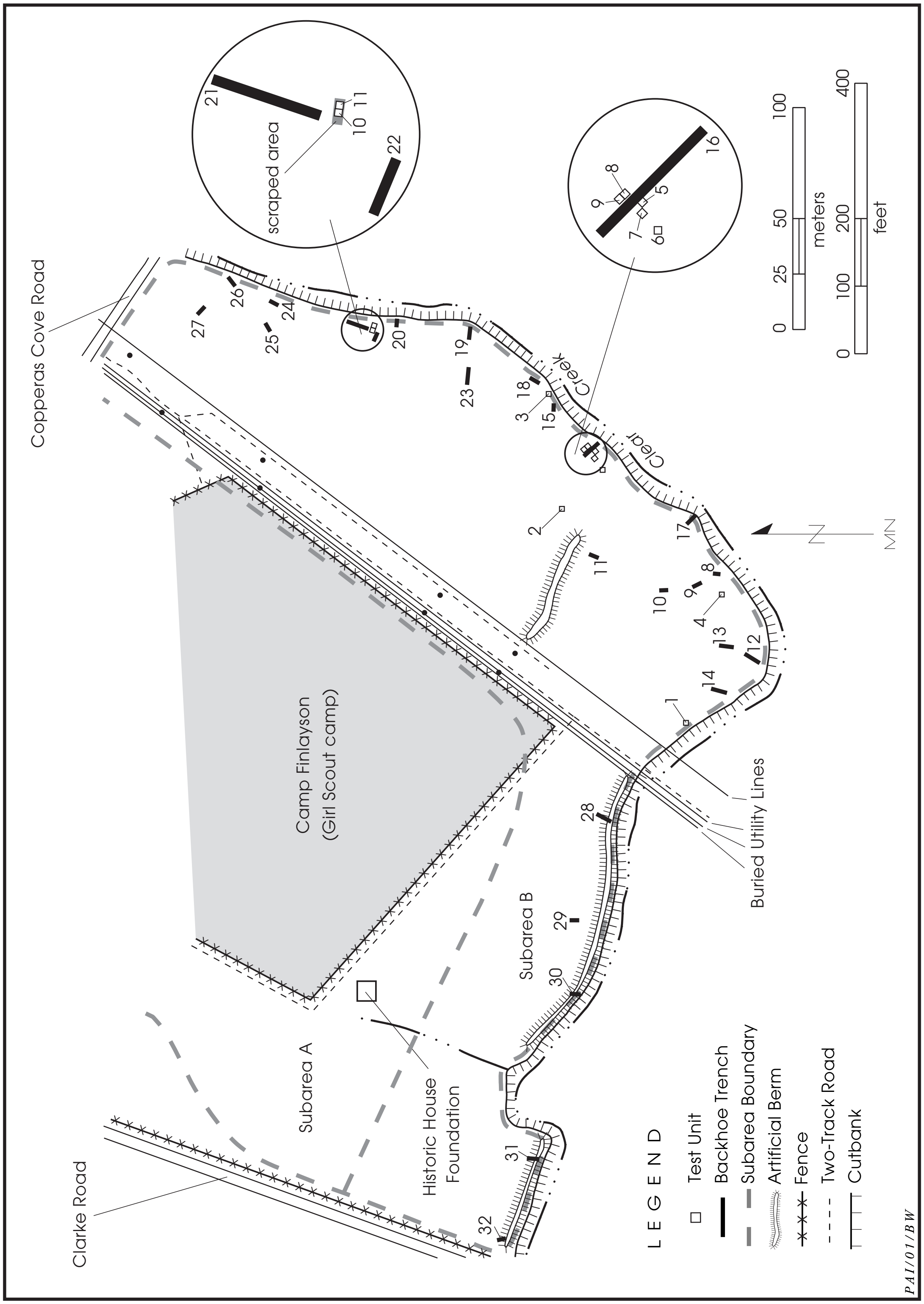

Figure 5.29. Site map of 41BL1039-B.

Table 5.16. Backhoe trenches at 41BL1039-B

Backhoe Trench*	Maximum Dimensions (m)	Orientation	Geomorphic Observations	Cultural Materials Observed
8	4.5x0.7x2.0	0°	T_1	
9	8.0x0.7x1.8	340°	T_1	
10	7.0x0.7x1.0	0°	interface of T_2 and T_1	on interface of T_2 and T_1
11	5.0x0.7x1.0	15°	T_2	burned rocks and lithic artifacts on surface
12	25.0x0.7x2.4	25–50°	bisects T_1 and T_0	
13	9.5x0.7x2.8	0°	T_1	
14	18.0x0.7x2.0	5°	bisects T_1 and T_0	
15	8.5x0.7x1.2	100°	T_1	
16	17.0x0.7x1.3	110°	T_1	lens of burned and unburned rocks at 40–50 cm
17	13.0x0.7x1.7	130°	T_1	
18	6.0x0.7x1.4	20°	T_1	
19	12.5x0.7x2.0	90°	T_1	
20	7.5x0.7x1.4	80°	T_1	
21	20.0x0.7x1.5	0°	T_1	
22	9.0x0.7x1.3	105°	T_1	one burned rock and unburned rocks at 30 cm
23	12.5x0.7x1.4	80°	interface of T_2 and T_1	
24	7.5x0.7x1.0	10°	T_1	
25	7.5x0.7x1.3	50°	T_1	
26	8.0x0.7x1.4	60°	T_1	
27	8.0x0.7x1.2	310°	T_1	
28	13.5x0.7x1.2	15°	interface of T_2 and T_1	one burned rock at 10 cm in berm
29	8.0x0.7x1.1	355°	T_1/Strath	
30	8.0x0.7x2.3	0°	T_1/Strath	
31	9.5x0.7x2.0	350°	T_1	chert cobbles, modern charcoal, and burned and unburned rocks at 10–20 cm
32	10.0x0.7x2.0	5°	T_1	

* Backhoe Trenches 1–7 were excavated by Mariah and Associates in 1993.

West Range alluvium (Nordt 1992). At least one paleosol was observed in several trenches, and the modern soil is weakly developed. The 144-cm-thick profile of Backhoe Trench 14 contains an Ap horizon (0–25 cm) that is very dark grayish brown silty clay loam with weak medium subangular blocky structure and less than 15 percent subangular limestone granules. The Bw horizon (25–44 cm) is dark yellowish brown silty clay loam with moderate coarse angular blocky structure and less than 15 percent subangular limestone granules and pebbles. The 2Ab horizon (44–91 cm) is black gravelly silty clay loam with weak medium subangular blocky structure, 15–35 percent subangular limestone granule and pebbles, and fine common distinct clay cutans on ped faces. The 2BC horizon (91–144 cm) is very dark gray silty clay with moderate coarse subangular blocky structure and 15–35 percent subangular to subrounded limestone pebbles and cobbles. The 3C horizon (144+ cm) is gray silty clay with medium common prominent light yellowish brown mottles.

Backhoe Trench 21 exhibits an A-C-Ab-Btb-Cg profile. The A horizon (0–22 cm) is a very dark grayish brown silty clay loam with weak coarse parting to medium subangular blocky structure and less than 15 percent subrounded limestone pebbles and snail shell fragments. The C horizon (22–33 cm) comprises a light

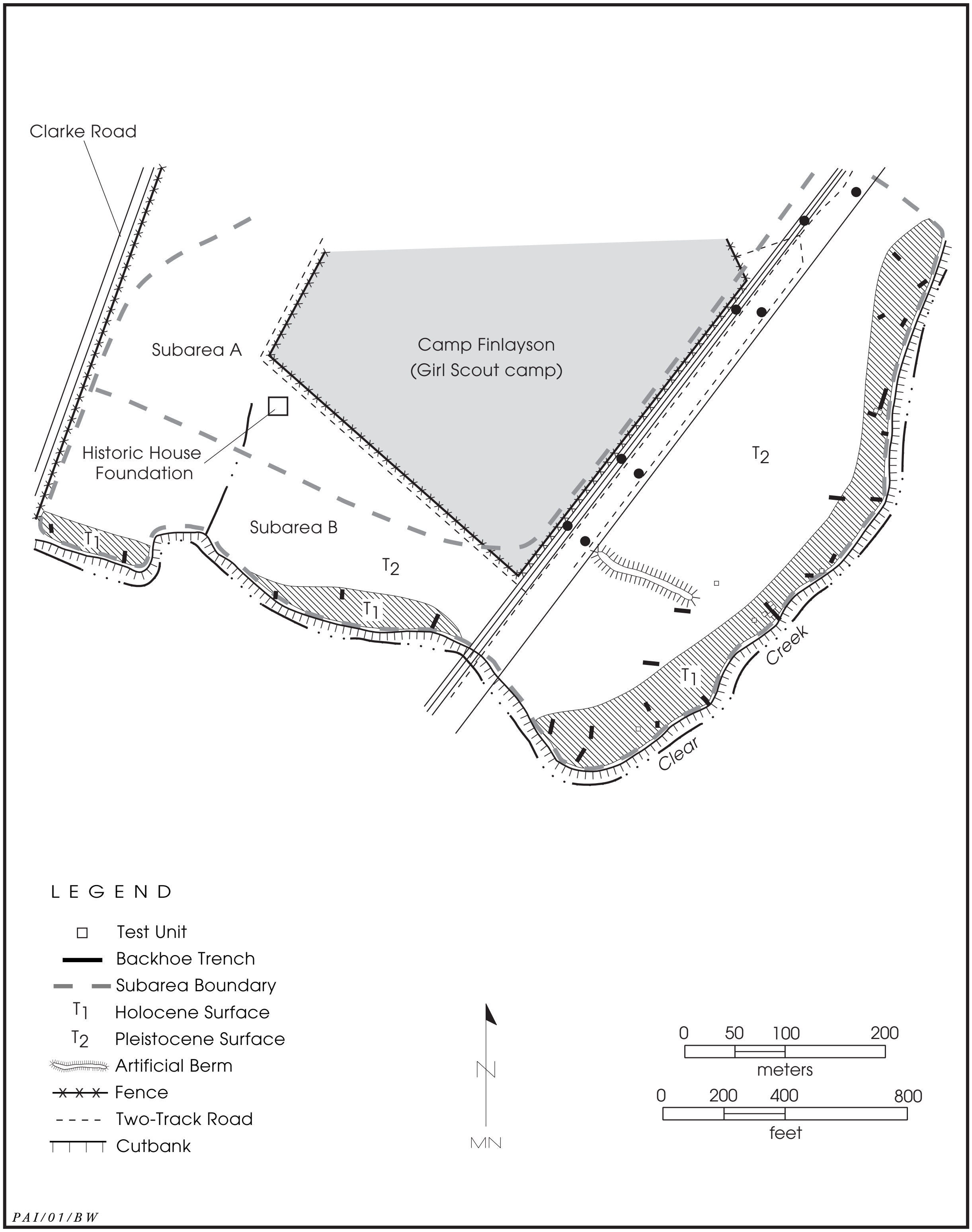

Figure 5.30. Site map of 41BL1039-B showing the Pleistocene (T_2) and Holocene (T_1) terraces.

olive brown clast-supported subangular very coarse sand and limestone granules with common snail shell fragments. The Ab horizon (33–67 cm) is a very dark gray gravelly silty clay loam exhibiting moderate coarse to medium subangular blocky structure and 15–35 percent subangular coarse sand and few limestone granules. The Btb horizon (67–95 cm) consists of a dark gray gravelly silty clay showing moderate subangular blocky structure and 15–35 percent subrounded very coarse sand and limestone granules. The Cg horizon (95+ cm) is a gray gleyed clay exhibiting medium common distinct light olive brown mottles.

The 102-cm-thick profile of Backhoe Trench 29 is formed in Holocene channel margin alluvium that caps a strath terrace. The A horizon (0–61 cm) is comprised of a dark brown gravelly silty clay exhibiting moderate coarse subangular blocky structure and 15–35 percent subangular limestone granules and pebbles. The Cr horizon (61–102 cm) consists of gray, silty clay and decomposing limestone bedrock fragments with 35–60 percent subrounded limestone granules, pebbles, and cobbles with few fine irregular iron nodules and common fine segregated carbonate filaments.

Backhoe Trench 31 reveals an A-C-Ab-Btssb-Cg profile. The A horizon (0–30 cm) is a very dark grayish brown silty clay loam exhibiting weak fine subangular blocky parting to coarse granular structure with less than 15 percent subrounded limestone granules. The BC horizon (30–42 cm) is a matrix-supported gravel bed, dark grayish brown gravelly silty clay loam exhibiting weak fine granular structure and 35–60 percent subangular very coarse sand and limestone granules and pebbles. The Ab horizon (42–67 cm) consists of a black gravelly silty clay exhibiting moderate coarse subangular blocky structure and 15–35 percent subangular coarse sand and limestone granules and pebbles. The Btssb horizon (67–90 cm) is a very dark grayish brown silty clay exhibiting moderate coarse subangular blocky structure and less than 15 percent subangular limestone granules, common fine distinct clay cutans on ped faces, and common interlocking slickensides. The Cg horizon (90–100 cm) is a gray clay and weathered limestone bedrock consisting of subrounded to subangular limestone pebbles and cobbles and having common distinct medium light olive brown mottles and some gleying.

Backhoe Trenches 10 and 23 are representative of the sediments occurring at the T_2-T_1 interface. These deposits consist of a thin mantle of fine-grained Holocene alluvium and possibly colluvium over gravelly Pleistocene alluvium. The 95-cm-thick profile of Backhoe Trench 23 reveals an A-2C soil profile. The A horizon (0–60 cm) is very dark gray silty clay exhibiting weak coarse subangular blocky parting to coarse granular structure with less than 15 percent subrounded limestone pebbles. The 2C horizon (60–95 cm) is a light olive brown matrix-supported gravel deposit with silty clay matrix with subrounded to subangular limestone granules, pebbles, and cobbles exhibiting no orientation. The clasts have thin and continuous coatings of carbonate (Stage II) and the matrix is weakly cemented (Birkeland 1984:Table A-4).

The Pleistocene terrace (T_2) has been subjected to plowing and subsequent erosion, affecting at least the upper 30 cm of deposit. These sediments most likely correlate to the Jackson alluvium (Nordt 1992).

Cultural Materials

Twenty levels excavated from Test Units 1, 3, and 4 were devoid of cultural materials, and a metal fragment was found in the upper 10 cm of deposits in Test Unit 1. Sixteen of 41 levels removed from the remaining 8 test units produced lithic artifacts and burned rocks (Table 5.17). Features 1 and 2 were encountered in three of the test units (see Cultural Features).

Cultural Features

Feature 1 was encountered from 45 to 70 cm across Test Unit 5 but was concentrated along the south wall. The feature was three to four rock layers thick and consisted of burned rocks (131.5 kg), unburned rocks (43 kg), and a few unmodified chert cobbles. Most of the rocks were fossiliferous limestone and greater than 15 cm in size. In cross section, the feature had an undulating base. One flake, a piece of leather, and one metal fragment were recovered from the feature fill, and an extensive root system occurred throughout. A few historic or modern items were present, but it is unclear if these materials were transported downward by bioturbation or if the artifacts were in secondary context.

Table 5.17. Summary of cultural materials from 41BL1039-B, Test Units 2 and 5–11

Provenience	Dart Points	Early- to Middle-stage Biface	Unmodified Debitage	Artifact Totals	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 2						
Level 1 (0–10 cm)*	–	1	19	20	28	5.50
Level 2 (10–20 cm)	–	–	–	0	2	0.50
Subtotals	0	1	19	20	30	6.00
TEST UNIT 5						
Level 4 (30–40 cm)	–	–	–	0	1	0.10
Level 5 (40–45 cm)	–	–	–	0	2	1.00
Feature 1 (45–70 cm)*	–	–	1	1	176	131.50
Level 8 (70–80 cm)	–	–	–	0	4	1.50
Subtotals	0	0	1	1	183	134.10
TEST UNIT 6						
Level 1 (0–10 cm)	–	–	1	1	–	–
TEST UNIT 7						
Level 3 (20–30 cm)	–	–	–	0	1	0.10
Level 5 (40–50 cm)	–	–	–	0	1	0.10
Level 6 (50–60 cm)	–	–	–	0	3	2.00
Level 7 (60–70 cm)	–	–	1	1	2	1.00
Subtotals	0	0	1	1	7	3.20
TEST UNIT 8						
Level 2 (10–20 cm)	–	–	–	0	13	9.50
Feature 2 (20–70 cm)*	–	–	–	0	**	**
Subtotals	0	0	0	0	13	9.50
TEST UNIT 9						
Level 2 (10–20 cm)	–	–	–	0	2	0.25
Feature 2 (25–50 cm)*	–	–	–	0	**	**
Subtotals	0	0	0	0	2	0.25
TEST UNIT 10						
Level 7 (60–70 cm)	–	–	1	1	–	–
Level 8 (70–80 cm)	–	–	1	1	–	–
Subtotals	0	0	2	2	0	0
TEST UNIT 11						
Level 7 (60–70 cm)	–	–	1	1	–	–
Level 8 (70–80 cm)	–	–	2	2	–	–
Subtotals	0	0	3	3	0	0
SURFACE	6	–	–	6	–	–
Totals	6	1	27	34	235	153.05

* Modern artifact observed (metal, ceramic, glass).
** Burned rocks present but not quantified.

Dense burned and several unburned rocks encountered at 20 cm across Test Unit 8 were designated as Feature 2. They occurred 30 cm above the top level of Feature 1 to the south. Feature 2 was left in situ, and Test Unit 9 was excavated to further delineate it. Feature 2 was encountered at 25 cm in the eastern half of Test Unit 9. Excavation of both units continued to 50 cm, where the feature matrix yielded large (10–30 cm in maximum dimensions) burned and unburned rocks. In Test Unit 8, a large assortment of historic materials was interspersed among the feature rocks from 58 cm to at least 70 cm. Artifacts included iron machine parts, ceramic pipe, metal and glass fragments, a belt buckle, and glass bottles. A small sample of historic artifacts was collected.

Based on the testing results, Features 1 and 2 probably represent the same feature—a dump associated with the historic occupation on site. The dump does not appear to be intrusive and is probably a surface feature that was buried by recent fluvial action.

Discussion

Dense artifact concentrations and possible features are exposed on the surface in the southern portion of the site, but these cultural materials are situated on the higher terrace (T_2). Although cultural materials were present in the upper 20 cm of deposits, the extensive disturbance to this ancient, stable landform has severely compromised the contextual integrity of any archeological deposits.

Twenty-two trenches and nine test units excavated on the T_1 yielded extremely sparse prehistoric artifacts. Historic modification of the landscape, along with recent deposition of sediments in a high-energy fluvial environment across much of this terrace, are additional factors that seriously limit the potential for intact prehistoric cultural components. Based on the testing results, 41BL1039-B is recommended as not eligible for listing in the National Register.

41CV70-B

Site Setting

Situated west of an unnamed tributary of Owl Creek, 41CV70 encompasses an upland surface and its slope, along with a Holocene-aged terrace (Figure 5.31). Roads and a tank trail cross the area, and a chert outcrop occurs on-site. Most of the area is cleared of large vegetation and supports grasses, but a dense oak-juniper woodland is present on the colluvial slope. Site elevation is 280 m above mean sea level.

Previous Work

Herring (Fort Hood Archeological Society) originally recorded the 400x300-m site on 26 April 1975. Bifaces, flakes, and chert nodules were noted on a low ridge located between two intermittent streams. A sample of bifaces and debitage was collected. Based on the observed artifacts, the area was considered a possible hunting or kill site. The only perceived disturbance was cattle grazing.

On 22 February 1976, Thomas (Fort Hood Archeological Society) analyzed the lithic artifacts collected the previous year. The assemblage consisted of scrapers, bifaces, knives, and a burin; thinning flakes and chunks also were noted.

Dureka and Pry (Texas A&M University) monitored the site on 7 December 1987. Although the 1975 site form listed the site size as 400x300 m, the monitoring crew revisited a site area of 170x170 m, as plotted on a large scale (1" = 400') contour map. One uniface, six flakes, and a few pieces of chert were observed. Because this site was recorded before the standard operating procedures for survey were established, the researchers recommended that the location did not fit the definition of a site and that the site number be retired.

On 13 November 1992, Frederick and Mehalchick (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A657–A659). Based on differing archeological potentials and geomorphic contexts, the site was divided into Subareas A and B. Based on the extent of cultural materials, the site size was expanded to 450x375 m.

Comprising two-thirds of the site area, Subarea A consisted of a portion of an upland ridge trending north-south, along with its east and west slopes. Across the ridge, Subarea A exhibited a thin, often discontinuous A-R profile. Pebble- to gravel-sized clasts of limestone and chert were common within the dark brown to black clay loam (A horizon). The same soil profile

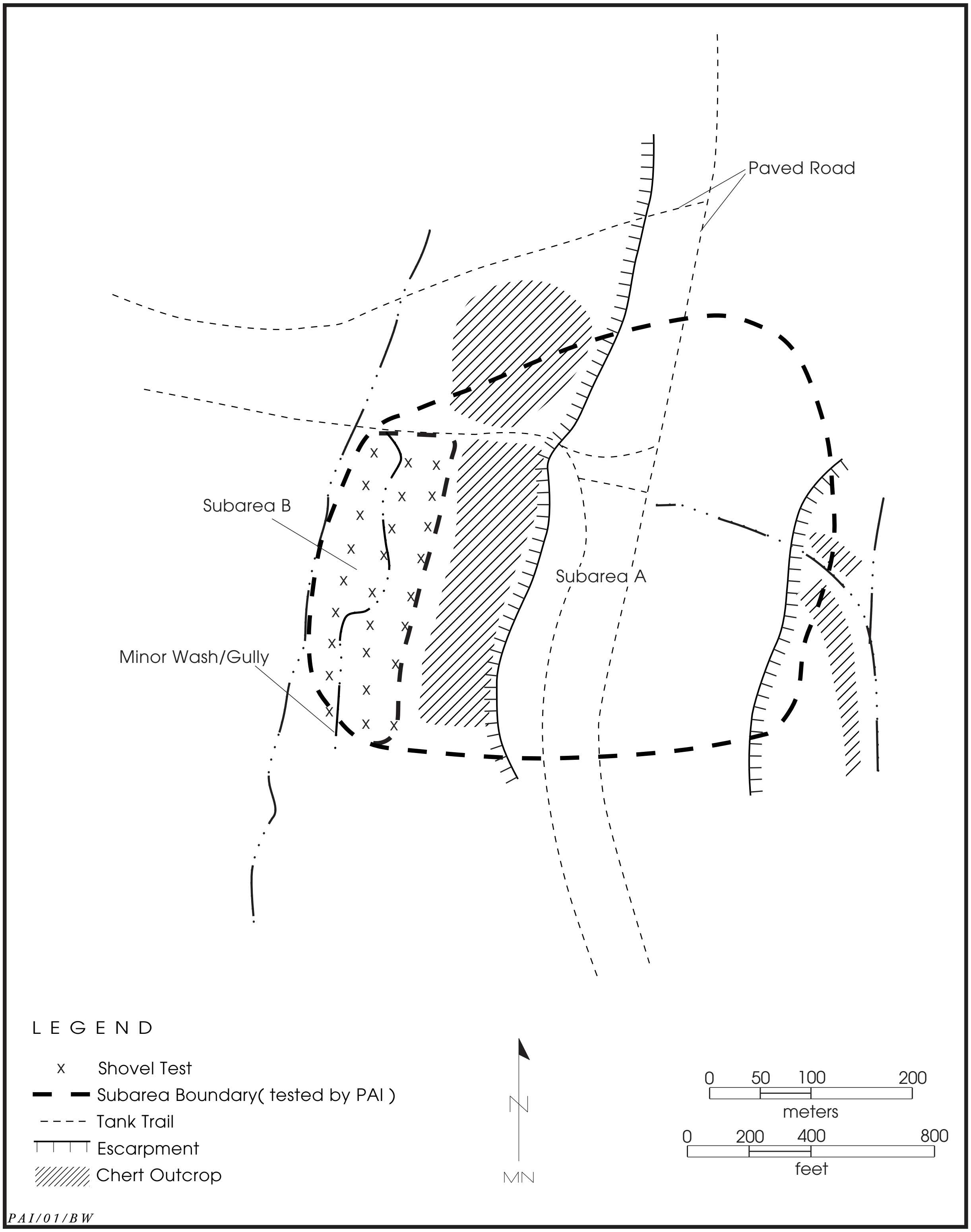

Figure 5.31. Site map of 41CV70 (modified from Trierweiler, ed. 1994:A658).

also was noted on the slopes, although erosion disturbed it substantially. At least two chert beds cropped out on the slopes. One bed contained cherts dark gray to dark olive gray in color, and the other contained a light brown chert. Debitage, cores, bifaces, and edge-modified flakes were observed across Subarea A. Erosion, cattle grazing, an old fence line, military activity, historic construction of a stone wall, vegetation clearing, an historic occupation, and probably cultivation had severely damaged the subarea. Because there is limited potential for intact archeological deposits, no further work was recommended for Subarea A.

Along the west site margin, Subarea B encompassed the tributary floodplain situated at the toe of a relatively steep colluvial slope. The near-complete absence of exposures precluded identification of any alluvial fills. Cattle grazing, roads, possible cultivation, and vegetation clearing had disturbed the upper portions of the solum, but deposits up to 2 m thick were considered possible. Sparse flakes were scattered across the surface of the subarea. Because Subarea B had the potential for buried cultural deposits, shovel testing was warranted.

On 2 and 3 December 1992, a crew excavated 26 shovel tests on Subarea B (Trierweiler, ed. 1194:A657–A659). Excavated to a maximum depth of 40 cm, only 7 of 26 shovel tests were positive. These tests yielded a total of seven flakes and two burned rocks from 0 to 40 cm, and one test unit contained glass fragments to 30 cm. The testing results indicated that the upper 40 cm of deposit had limited archeological potential, but researchers noted that there might be intact cultural deposits present at a greater depth. Recommended testing to determine National Register eligibility consisted of a minimum of three backhoe trenches (Trierweiler, ed. 1994:A659).

Work Performed

On 5 June 2000, formal testing of Subarea B at 41CV70 was completed (Figure 5.32). The excavations consisted of four backhoe trenches (Backhoe Trenches 1–4) and one 1.00x0.50-m test unit (Test Unit 1); a total of 1.05 m^3 was manually excavated. No cultural materials were observed in the tributary cutbank.

At the north end of 41CV70-B, Backhoe Trench 1 was excavated just east of the tributary. The trench measured 10.0x0.7x2.6 m. Backhoe Trench 2 was excavated about 75 m south of Backhoe Trench 1 and partially within and east of the minor gully. The trench had maximum dimensions of 8.0x0.7x2.7 m. Approximately 70 m southeast of Backhoe Trench 2, Backhoe Trench 3 measured 11.0x0.7x1.2 m and crossed the toeslope where lithic artifacts and chert cobbles were exposed on the surface. Backhoe Trench 4 measured 8.0x0.7x1.6 m and was excavated near the south end of 41CV70-B, about 65 m southwest of Backhoe Trench 3. None of the trenches encountered cultural materials.

Terminated at an arbitrary depth of 210 cm, Test Unit 1 was placed along the south wall of Backhoe Trench 1.

Site Extent and Depth

The terrace is delimited by the colluvial slope and tributary to the east and west, respectively. Although the landform continues an unknown distance to the north and south, 41CV70-B has maximum dimensions of 240 m north-south by 100 m east-west based on the extent of surficial cultural materials. Because of the paucity of subsurface artifacts, no intact archeological deposits could be identified.

Sediments and Stratigraphy

The deposits in each backhoe trench were examined, and soil stratigraphic profiles were described for Backhoe Trenches 1 and 3. The alluvial deposits of Backhoe Trench 1 are 206 cm thick and consist of dark clay loams with few to common dispersed limestone and chert gravels. They are probably late Holocene in age, but the presence of iron and manganese concretions and highly weathered, soft limestone gravels throughout the lower deposits suggest that they may predate the late Holocene. The profile of Backhoe Trench 1 exhibits an A-Bw-Bw2-R soil. The A (0–35 cm) horizon is a very dark grayish brown clay loam, and the Bw (35–152 cm) horizon is a dark grayish brown clay loam. The Bw2 horizon (152–206 cm) consists of a grayish brown clay loam. Weathered bedrock was encountered at 206–221+ cm below the surface.

The profile of Backhoe Trench 3 consists of late Holocene colluvial and slopewash sediments overlying weathered limestone bedrock.

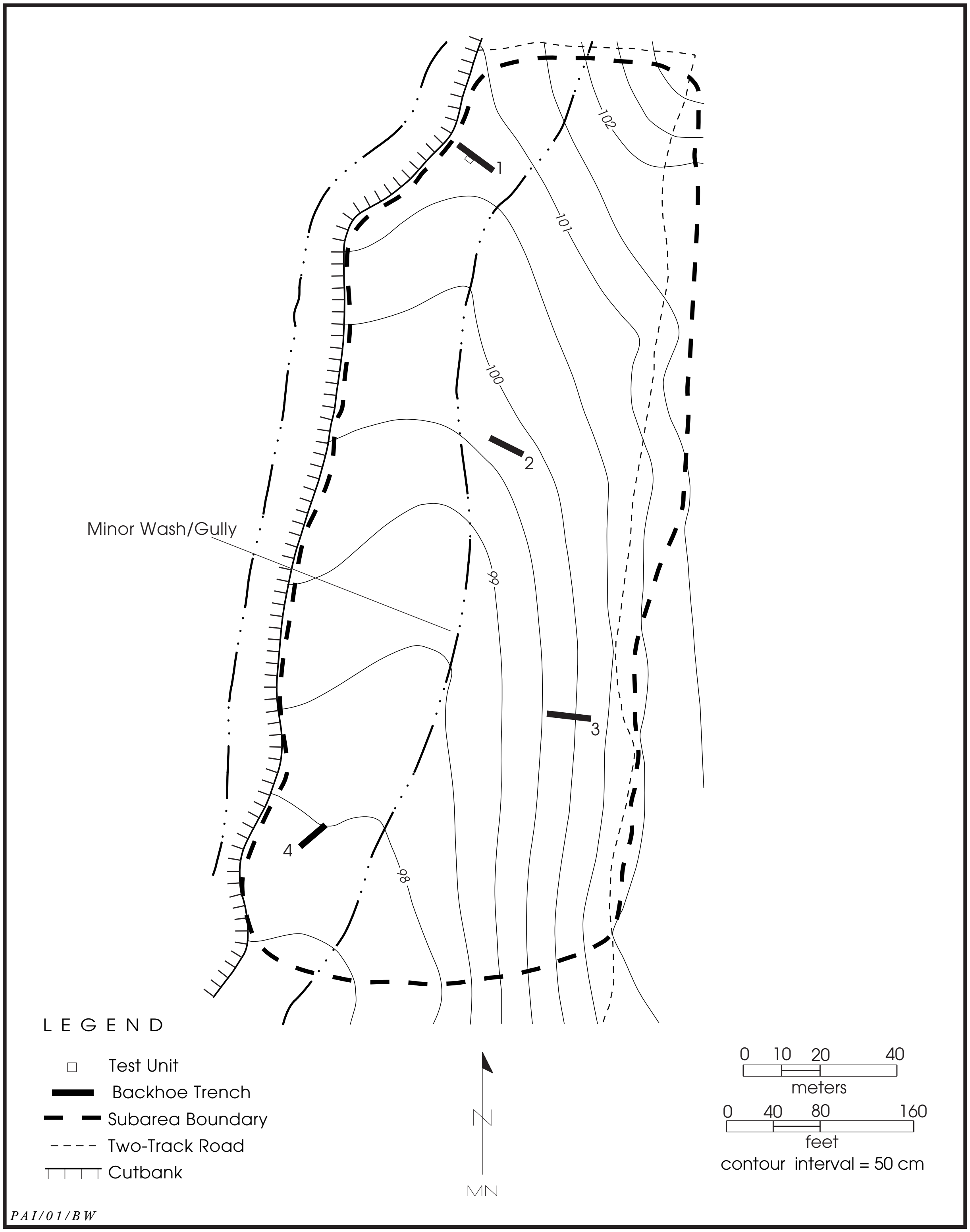

Figure 5.32. Site map of 41CV70-B.

These sediments are comprised of dark clay loams with dispersed limestone and chert gravels, exhibiting an A-Bw-R soil profile. The A horizon (0–41 cm) is a black clay loam with angular to subangular (2 percent) limestone gravels. The Bw horizon is a 40-cm-thick very dark gray clay loam with angular to subangular (5 percent) limestone and chert gravels that increase in frequency (to 25 percent) in the lower half of the horizon. Weathered bedrock was encountered between 81 and 106 cm below the surface.

Cultural Materials

Of 21 levels excavated from Test Unit 1, one flake was found in the 20–30 cm level, and one flake was found from 150 to 160 cm. A piece of rubber tire tread was noted at 10–20 cm, and unburned hackberry seeds were present throughout the unit from 140 to 190 cm.

Discussion

Past and present investigations reveal that historic and military activities have affected the upper 20–30 cm of deposits. Based on the paucity of cultural materials, no deeply buried isolable cultural components are present in the excavations. Therefore, 41CV70-B is recommended as not eligible for listing in the National Register.

41CV118-B

Site Setting

Site 41CV118 is situated on various landforms along and west of an unnamed tributary of Owl Creek, immediately east of the Live Fire Area (Figure 5.33). Two-track roads crisscross the site, and the area primarily supports grasses, with isolated junipers and small oak mottes. Along the drainage, there is a riparian woodland including live oak, cedar elm, juniper, and redbud. Site elevation is 230 m above mean sea level.

Previous Work

Thomas (Fort Hood Archeological Society) first recorded 41CV118 on 26 May 1977. Based on the site sketch map, the site measured about 450x250 m. Bifaces, flakes, and burned rocks were noted across a low, broad terrace that was eroded and deflated. One Marshall dart point was collected. To the west, the site extended an unknown distance toward the Cold Springs Helicopter Gunnery Range in the Live Fire Area.

On 17 February 1993, Abbott and Turpin (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A745–A747). Based on differing archeological potentials, geomorphic contexts, and access, the site was divided into Subareas A, B, and C. The site size was modified to 600x200 m based on the extent of cultural materials, but the western site boundary was not established because it extended into the Live Fire Area.

Subarea A was defined as the portion of the site within the Live Fire Area, but this area was not inspected or evaluated. It was recommended that Subarea A be assigned a separate site number and evaluated later.

Subarea B encompassed the colluvial toeslope, two higher terraces (T_{1a} and T_{1b}), and the modern gravel bar (T_0). Because there was minimal exposure away from the cutbank edge, little could be said about the character or depth of the sediments, but the topography suggested considerable complexity in stratigraphic architecture. The colluvial toeslope was moderately gravelly and supported a dark grayish brown clay loam A horizon. The T_1 surfaces were relatively flat and separated by a distinct, rounded scarp. The higher (T_{1a}) surface rested 3.0–3.5 m above the channel, and the lower (T_{1b}) surface was 2.5–3.0 m high. At least two Holocene-aged fills were observed, but it was likely that additional deposits lay beneath the T_{1b} surface. The cutbank exposure suggested that up to 3 m of grayish brown clay loam interfingered with several gravel stringers (A-Bw profile) underlay both terraces. Sparse debitage, cores, and chert cobbles were scattered across the terraces. Military activity, bioturbation, and possible cultivation had disturbed the subarea. Because Subarea B had the potential for buried cultural deposits, shovel testing was warranted.

Subarea C consisted of the low, rolling portion of the intermediate (Killeen) upland that was mantled with a thin, discontinuous clay loam A horizon. Also included in Subarea C was a low mound of fluvial gravels situated in the middle of the T_{1a} (Subarea B). This isolated gravel knoll appears to represent a

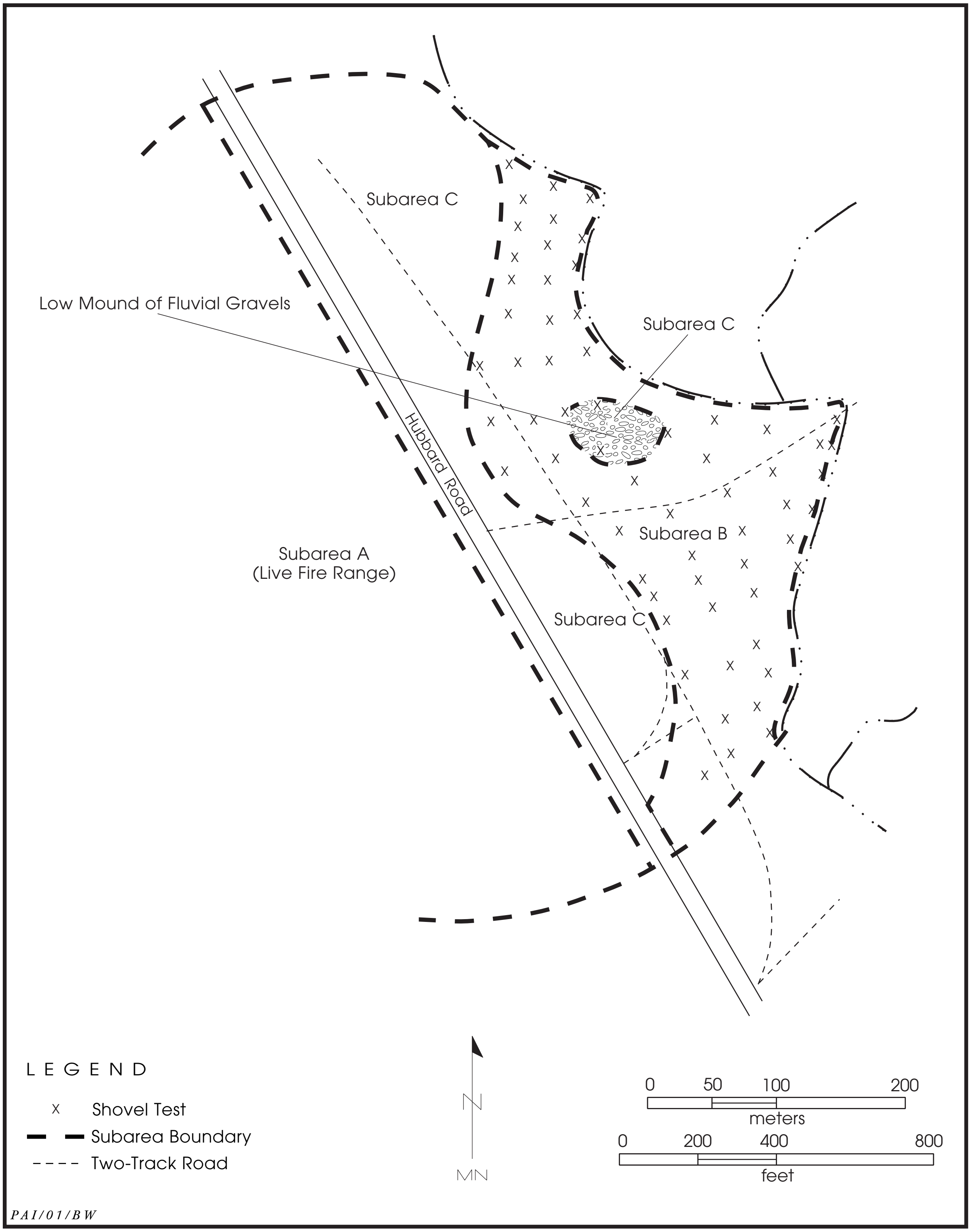

Figure 5.33. Site map of 41CV118 (modified from Trierweiler, ed. 1994:A746).

Pleistocene terrace (T_2) remnant. Sparse debitage and chert cobbles were scattered across Subarea C, which sheet erosion and vehicular traffic had heavily disturbed. Because the potential for intact archeological deposits was limited, no further work was recommended for Subarea C.

On 2–3 March 1993, a crew excavated 62 shovel tests on Subarea B (Trierweiler, ed. 1994:A745–A747). Excavated to a maximum depth of 50 cm, 15 shovel tests (24.2 percent) yielded cultural materials. Thirty-one flakes were recovered from 0 to 50 cm, with 21 of the flakes recovered from the upper 20 cm of deposit. Glass, metal, and a historic ceramic sherd were also found at 0–20 cm. Although the shovel test results indicated that the upper 40 cm of deposits had limited archeological potential, intact cultural deposits were potentially present at a greater depth. Testing recommended to determine National Register eligibility consisted of a minimum of two backhoe trenches and 2 m^2 of manually excavated test units (Trierweiler, ed. 1994:A747).

Work Performed

Formal testing of Subarea B at 41CV118 was completed on 8 June 2000 (Figure 5.34). Excavations consisted of 11 backhoe trenches (Backhoe Trenches 1–11) and 2 1.00x0.50-m test units (Test Units 1–2); a total of 2.3 m^3 was manually excavated. No cultural materials were observed in the tributary cutbank.

On the IGAS (contour) map, the northern portion of 41CV118 overlaps historic site 41CV664 (field number 742). Site 41CV664 is a habitation site with a possible foundation, a well, and an artifact scatter consisting of earthenware, porcelain, glass, tin cans, barbed wire, and a mower blade (Roemer et al. 1989:65). The site probably dates to the late nineteenth or early twentieth century (Blake 2001:Tables 13 and 16). More than a third of the area was disturbed by vehicle traffic and roads.

Backhoe Trenches 1 and 5 were excavated on the western margin of the colluvial toeslope at the northern and southern ends of Subarea B. The trenches were 8–9 m long, 0.7 m wide, 1.45–1.70 m deep, and exposed no cultural materials.

Backhoe Trench 4 was placed on the upper margin of the T_{1a} surface near the base of the colluvial slope, but Trenches 2, 3, 10, and 11 were spaced across the level terrace surface. Trenches were 7.5–11.0 m long, 0.7 m wide, and 1.8–2.2 m deep. The only cultural materials observed were two small burned rocks found among unmodified chert nodules at ca. 90 cm in Backhoe Trench 3.

Backhoe Trenches 6–9 were spaced across the center of the T_{1b} surface. Near the south end of the terrace, Backhoe Trench 6 had maximum dimensions of 9.5x0.7x2.6 m. Backhoe Trench 7 was placed near the center of the T_{1b} surface and close to the tributary cutbank; it had maximum dimensions of 13.5x0.7x2.9 m. Aligned to 290°, Backhoe Trench 8 (7.0x0.7x1.6 m) was excavated about 60 m northeast of Trench 7. At the north end of the T_{1b}, Backhoe Trench 9 measured 12.0x0.7x2.5 m. All four of these trenches were devoid of cultural materials.

Arbitrarily terminated at 170 cm, Test Unit 1 was placed along the south wall of Backhoe Trench 3. Test Unit 2 was excavated adjacent to the east wall of Backhoe Trench 7. The unit was arbitrarily halted at 290 cm.

Site Extent and Depth

The colluvial slope and Holocene terraces are wedged between the upland surface and an unnamed tributary. These landforms continue to the north and south, but the extent of surficial cultural materials and the excavation results indicate that 41CV118-B has maximum dimensions of 450 m north-south by 280 m east-west. Cultural materials, dominated by debitage, were scattered throughout the hand excavations, but no stratigraphically discrete archeological components were encountered.

Sediments and Stratigraphy

The deposits at the base of the colluvial toeslope and on the T_{1a} and T_{1b} terraces were observed and described in 7 of 11 backhoe trenches (Figure 5.35). Backhoe Trench 1 consists of a 75-cm-thick mantle of late Holocene colluvium and slopewash overlying a truncated alluvial deposit (75–140+ cm) that is probably late Pleistocene in age and correlates to Nordt's (1992) Jackson alluvium. This profile is imprinted with an A-Bw-2Bb soil. The A horizon (0–44 cm) is a very dark gray clay loam with angular to subangular (10 percent) gravels, and

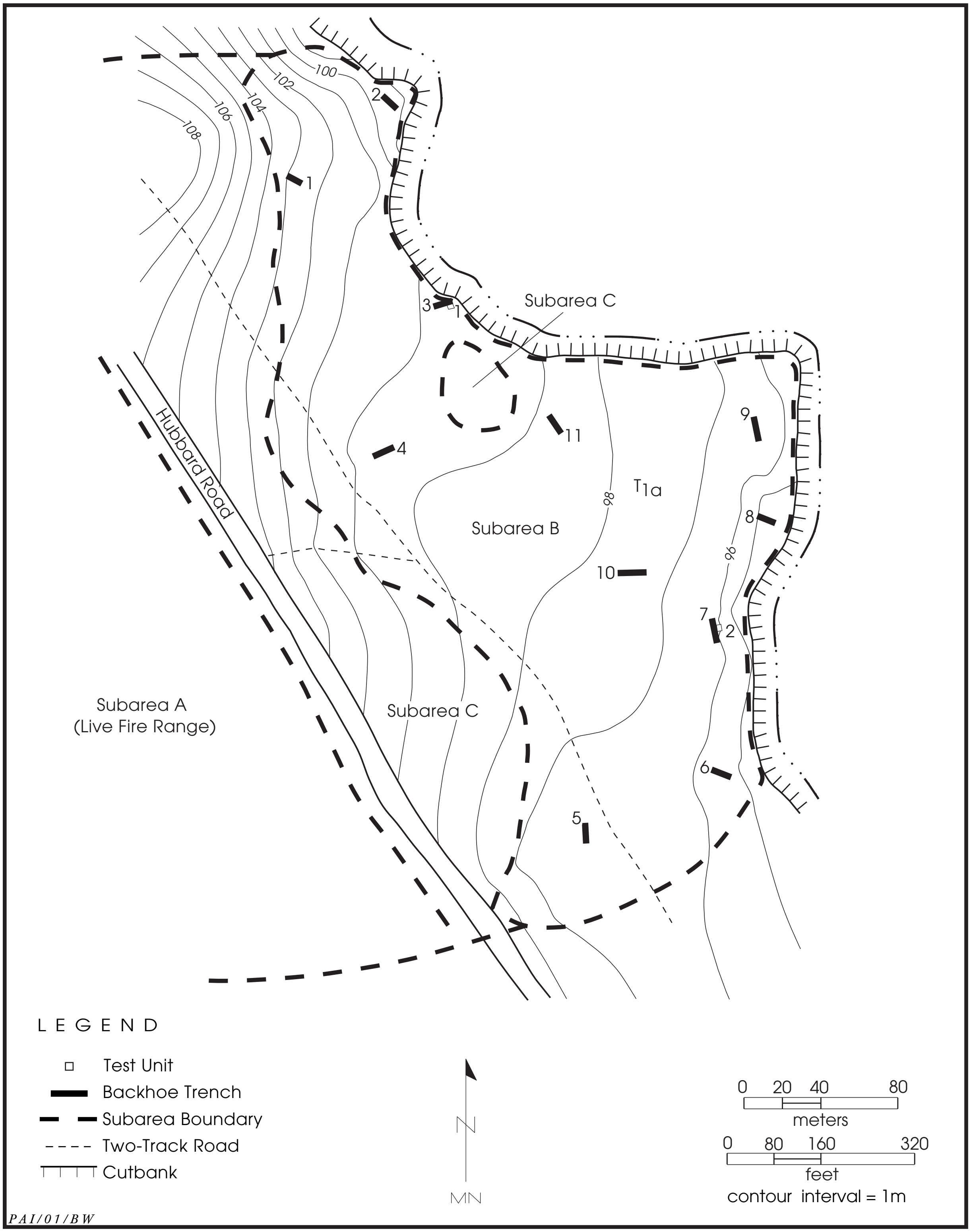

Figure 5.34. Site map of 41CV118-B.

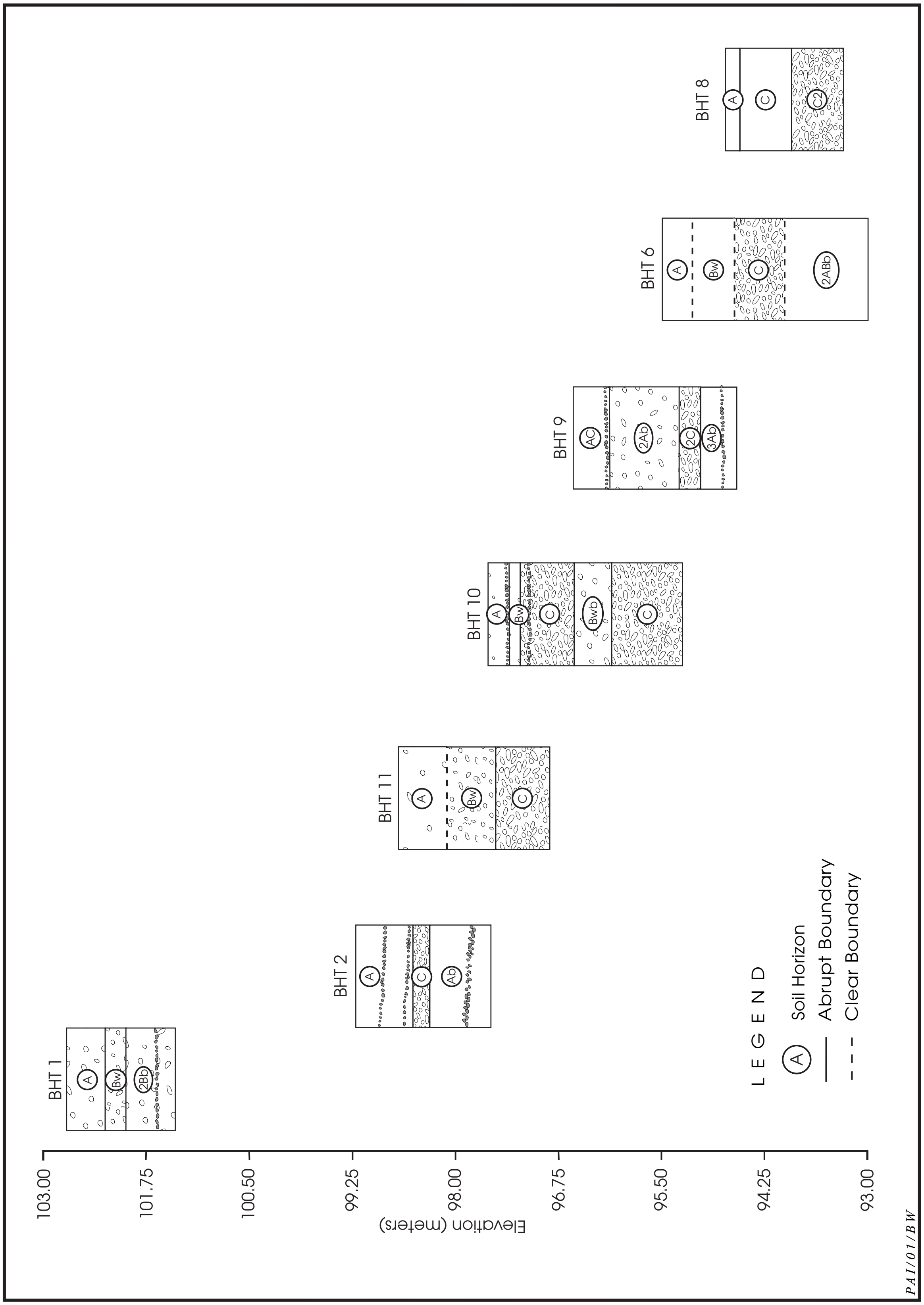

Figure 5.35. Profiles of Backhoe Trenches 1, 2, 6, and 8–11, 41CV118-B.

the Bw horizon (44–75 cm) is a very gravelly dark grayish brown clay loam. An abrupt smooth boundary separates the Bw horizon of the late Holocene mantle and the underlying truncated late Pleistocene 2Bb soil. The 2Bb horizon (75–140+ cm) is a light brownish gray clay loam with many brownish yellow mottles. A few dispersed gravels and a gravel stringer are present at 112 cm within the soil horizon.

Three of the described backhoe trench profiles (Backhoe Trenches 2, 10, and 11) examined deposits in the T_{1a}, which are composed of West Range alluvium. These deposits consist primarily of gravelly and more-fine-grained (with gravel stringers) channel fill facies (point bar). The backhoe trench profiles display sequences of upward-fining point bars capped by soils, which represent periods of surface stability. The upward-fining sequence is best displayed in Backhoe Trench 11, which displays an upward-fining bed of subrounded to rounded clast-supported gravels at the base and overlying loamy deposits with gravel stringers and matrix-supported gravels. The profile is imprinted with an A-Bw-C soil. The A horizon (0–60 cm) is a dark gray clay loam with 5 percent limestone gravels. Bw horizon (60–122 cm) is a brown silty clay loam with matrix-supported gravels and gravel stringers, and C horizon (122–182+ cm) represents the basal gravel bed. Upper portions of earlier upward-fining sequences were observed in Backhoe Trenches 2 and 10 in the form of pedogenically altered loamy deposits, some with gravel stingers, underlying the gravelly channel fill facies.

Backhoe Trenches 6, 8, and 9 consist of Ford and West Range alluvium that underlies the T_{1b} surface. As with the T_{1a}, the deposits of the T_{1b} consist of gravelly and loamy (with gravel stringers) channel fill facies or point bar deposits. In Backhoe Trench 9 the mantle of Ford alluvium is thin (40 cm) and pinches out to the north. An upward-fining sequence of West Range alluvium (40–145 cm) underlies the Ford mantle. These deposits consist of a bed of poorly sorted, clast-supported, subrounded to rounded gravels underlying a very dark grayish brown clay loam. The deposits are imprinted with a 2Ab-2C soil profile. The upper portion of earlier upward-fining sequence underlies the gravel bed (145–198+ cm) and consists of a pedogenically altered (3Ab horizon) very dark gray to grayish brown sandy clay loam with gravel stringers. The profile of Backhoe Trench 6 is similar in that it displays a mantle of Ford alluvium (0–89 cm) overlying West Range alluvium (89–250+ cm). The Ford alluvium consists of a very dark grayish brown A horizon and dark grayish brown Bw horizon. The West Range alluvium comprises a gravel bed that dips to the west and consists of moderately sorted, clast-supported gravels with the interstices filled with pale brown sandy clay sediments (89–155 cm). Similarly, the upper portion of an earlier upward-fining sequence underlies the gravel bed at 155–250+ cm and is imprinted with a dark grayish brown 2ABb horizon. The profile of Backhoe Trench 8 displays an upward-fining sequence of muddy sandy gravel to sandy clay to clay loam. The deposits are imprinted with an A-C-C2 soil profile and correlate to the Ford alluvium.

Cultural Materials

Test Unit 1 produced a total of 37 flakes from 0 to 170 cm (Table 5.18). No level contained more than 7 pieces of debitage. Deposits from surface to 290 cm in Test Unit 2 yielded an edge-modified flake, 71 pieces of debitage, and 11 small burned rocks. Most of these levels producing artifacts also contained common gravels and unmodified chert nodules. Dense gravel deposits occurring at 80–120 cm and 240–256 cm were removed and not screened.

Discussion

The excavations located on the colluvial toeslope and terraces comprising 41CV118-B did not encounter stratigraphically discrete cultural deposits. Most of the excavations consist of very gravelly channel fill facies indicating high-energy deposition. Most of the cultural materials recovered from the test units were found in gravelly alluvium, suggesting that the artifacts are in secondary context. Based on the testing results, 41CV118-B is recommended as not eligible for listing in the National Register.

41CV506

Site Setting

Site 41CV506 is located mostly north of an

Table 5.18. Cultural materials from 41CV118-B, Test Units 1 and 2

Provenience	Edge-modified Flake	Unmodified Debitage	Artifact Totals	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1					
Level 2 (10–20 cm)	–	1	1	–	–
Level 3 (20–30 cm)	–	3	3	–	–
Level 5 (40–50 cm)	–	7	7	–	–
Level 7 (60–70 cm)	–	5	5	–	–
Level 8 (70–80 cm)	–	3	3	–	–
Level 9 (80–90 cm)	–	1	1	–	–
Level 10 (90–100 cm)	–	3	3	–	–
Level 11 (100–110 cm)	–	1	1	–	–
Level 12 (110–120 cm)	–	3	3	–	–
Level 13 (120–130 cm)	–	2	2	–	–
Level 14 (130–140 cm)	–	4	4	–	–
Level 15 (140–150 cm)	–	1	1	–	–
Level 16 (150–160 cm)	–	2	2	–	–
Level 17 (160–170 cm)	–	1	1	–	–
Subtotals	0	37	37	0	0.00
TEST UNIT 2					
Level 3 (20–30 cm)	–	1	1	–	–
Level 4 (30–40 cm)	–	7	7	7	0.50
Level 5 (40–50 cm)	–	12	12	4	0.50
Level 6 (50–60 cm)	–	7	7	–	–
Level 7 (60–70 cm)	–	2	2	–	–
Level 13 (120–130 cm)	–	16	16	–	–
Level 14 (130–140 cm)	–	9	9	–	–
Level 15 (140–150 cm)	1	7	8	–	–
Level 16 (150–160 cm)	–	1	1	–	–
Level 17 (160–170 cm)	–	8	8	–	–
Level 18 (170–180 cm)	–	1	1	–	–
Subtotals	1	71	72	11	1.00
Totals	1	108	109	11	1.00

underground water pipeline, and a spring-fed, unnamed tributary of Owl Creek crosses the eastern portion (Figure 5.36). Most of the site is on an upland surface and its slope that is predominately a dense oak-juniper woodland, but portions have been cleared and are covered with grasses. Holocene alluvial terraces along the drainage support riparian forest with a varied understory. Site elevation is 260–270 m above mean sea level.

Previous Work

Nightengale (Texas Archeological Survey) first recorded the site on 3 June 1981. The site dimensions were unknown because it extended into adjacent quadrants that were not surveyed. Dense concentrations of nodules and cobbles, along with flakes, bifaces, unifaces, and cores, characterized this large, lithic quarry site. Projectile points, bifaces, and one mano were collected. The depth of the deposits was shallow, and vehicular traffic, a road, and construction of a pipeline affected the site area. Based on the IGAS (contour) map plotting, the site was later classified as a Lithic Resource Procurement Area for management purposes.

Moore and Strychalski (Texas A&M University) monitored the site on 29 January 1986. One biface and occasional flakes were observed within a large chert field. No site map was available, and it was recommended that the site "be relocated or removed from the site inventory."

On 11 June 1993, Abbott and Kleinbach (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A935–A941). Because archeological potentials and geomorphic contexts differed, the site was divided into Subareas A and B. Based on the extent of cultural materials, the maximum site dimensions were defined as 1,300x400 m. The potential for the site to address questions of lithic resource procurement and reduction was also assessed.

Subarea A subsumed the sloping upland surfaces on either side of the creek. Much of the upland slope had been cleared for agriculture. Upslope, the surface was primarily bare nodular limestone mantled by a discontinuous carpet of juniper needles and thin organic slopewash. Downslope, a colluvial, over-thickened clay soil exhibited a well-developed Ap-R profile. This soil was up to 60 cm thick but plowing extensively disturbed it. A very sparse, scattered lag of fine-grained, brown to gray chert

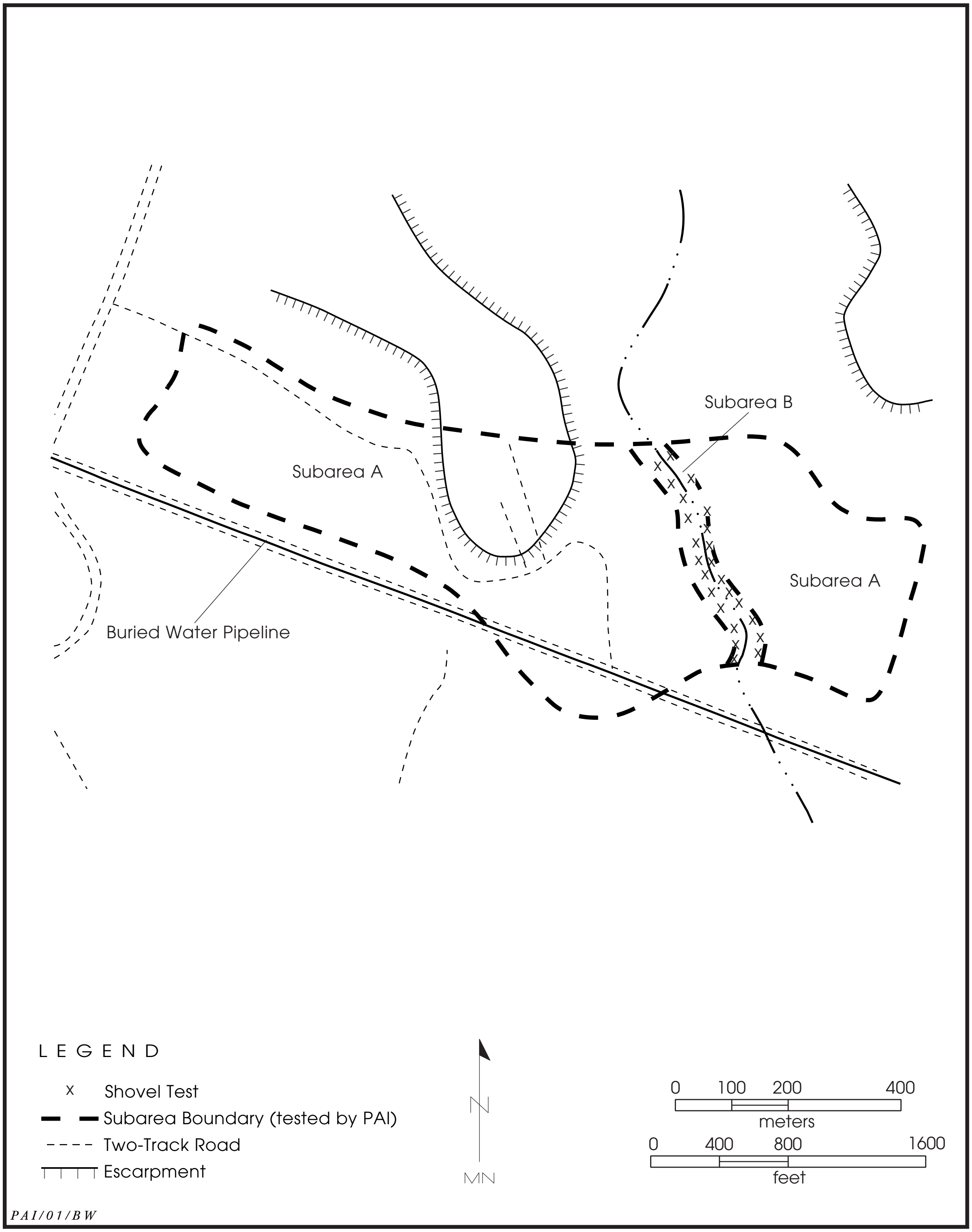

Figure 5.36. Site map of 41CV506 (modified from Trierweiler, ed. 1994:A936).

resting on exposed bedrock covered the upper slopes. A dense pavement of multicolored, fine-grained chert nodules cropped out along the middle of the slope. Downslope, the same range of material occurred as colluvial clasts within the plowed soil. Further downslope to the southwest, the chert thinned out considerably. Abundant flakes and sparse quartzite cobbles were observed at the northern edge of Subarea A; sparse debitage was scattered across the rest of the subarea. Chert and impact zones were identified, mapped, and described, and chert samples were collected. Because there is limited potential for intact subsurface archeological deposits, shovel testing was not warranted in Subarea A. Because Subarea A contained chert resources and was not completely disturbed, however, a crew returned on 15 June 1993 to survey and assess this Lithic Resource Procurement Area's research potential. The results of this survey indicated that portions of Subarea A were potentially eligible for National Register listing because they could provide useful data for lithic procurement issues. In 1995–1996, however, consultation between Prewitt and Associates, the Texas Historical Commission, and Fort Hood archeologists led to a consensus that Lithic Resource Procurement Areas on Fort Hood have a low research potential and are not eligible for listing in the National Register (Boyd et al. 2000:20–21).

Subarea B encompassed terraces on both sides of an unnamed tributary of Owl Creek. The terrace surface sloped gently and was 2.0–2.5 m above the modern channel. Most of the fill was a gravelly black clay exhibiting a weak A-Bw profile, probably equivalent to the West Range alluvium (Nordt 1992). In one locality, this deposit was inset into an orange brown gravelly loam probably representing the Fort Hood alluvium. The terrace was densely covered with junipers and mixed hardwoods, and only a few colluvial chert cobbles and nodules were observed. Because Subarea B had the potential for buried cultural deposits, shovel testing was warranted.

On 14 June 1993, a crew excavated 24 shovel tests on Subarea B (Trierweiler, ed. 1994:A935–A941). Excavated to a maximum depth of 50 cm, 15 shovel tests (62.5 percent) yielded 104 flakes, a few cores, and 3 bone fragments. Seven tests contained a high frequency of artifacts at 20–40 cm; most of these were located on the east side of the creek at the southern end of the subarea and the west side of the creek in the central portion of the subarea. The testing results suggested that the upper 40 cm of deposits had the potential to contain intact archeological remains, and intact cultural deposits were possibly present at a greater depth. The recommended testing effort to determine National Register eligibility consisted of a minimum of 4–6 m^2 of manually excavated test units (Trierweiler, ed. 1994:A938).

Work Performed

On 21 June 2000, formal testing of Subarea B at 41CV506 was completed (Figure 5.37). Backhoe trenching was not conducted because the site was located within a protected endangered species habitat and road access to the area was lacking. A careful inspection revealed that the Holocene-aged terrace is not continuous, and varies greatly in width. No cultural materials were observed in the tributary cutbank. Test excavations consisted of eight 1x1-m units (Test Units 1–8), with a total of 8.25 m^3 manually excavated. Some units were placed in areas where positive shovel tests occurred, and other locations were selected to provide coverage across the terraces. Each excavation was terminated when moderate to dense channel gravels were encountered.

Test Unit 1 was placed on the west terrace in the northern portion of 41CV506-B. Test Unit 2 was situated about 65 m south of Test Unit 1 and 15–20 m west of the tributary cutbank. Test Unit 3 was located near the southeast site margin, whereas Test Unit 4 was placed in the east-central section of the subarea. On the east bank of the tributary, Test Unit 5 was situated almost equidistant between Test Units 3 and 4. A few meters west of the cutbank edge, Test Unit 6 was placed across the tributary and south of Test Unit 5. Test Unit 7 was situated in the north-central portion of the western terrace, and Test Unit 8 was excavated approximately 25 m north-northeast of Test Unit 4. All excavations were terminated between 60 and 130 cm.

Site Extent and Depth

On either side of the tributary, the outer

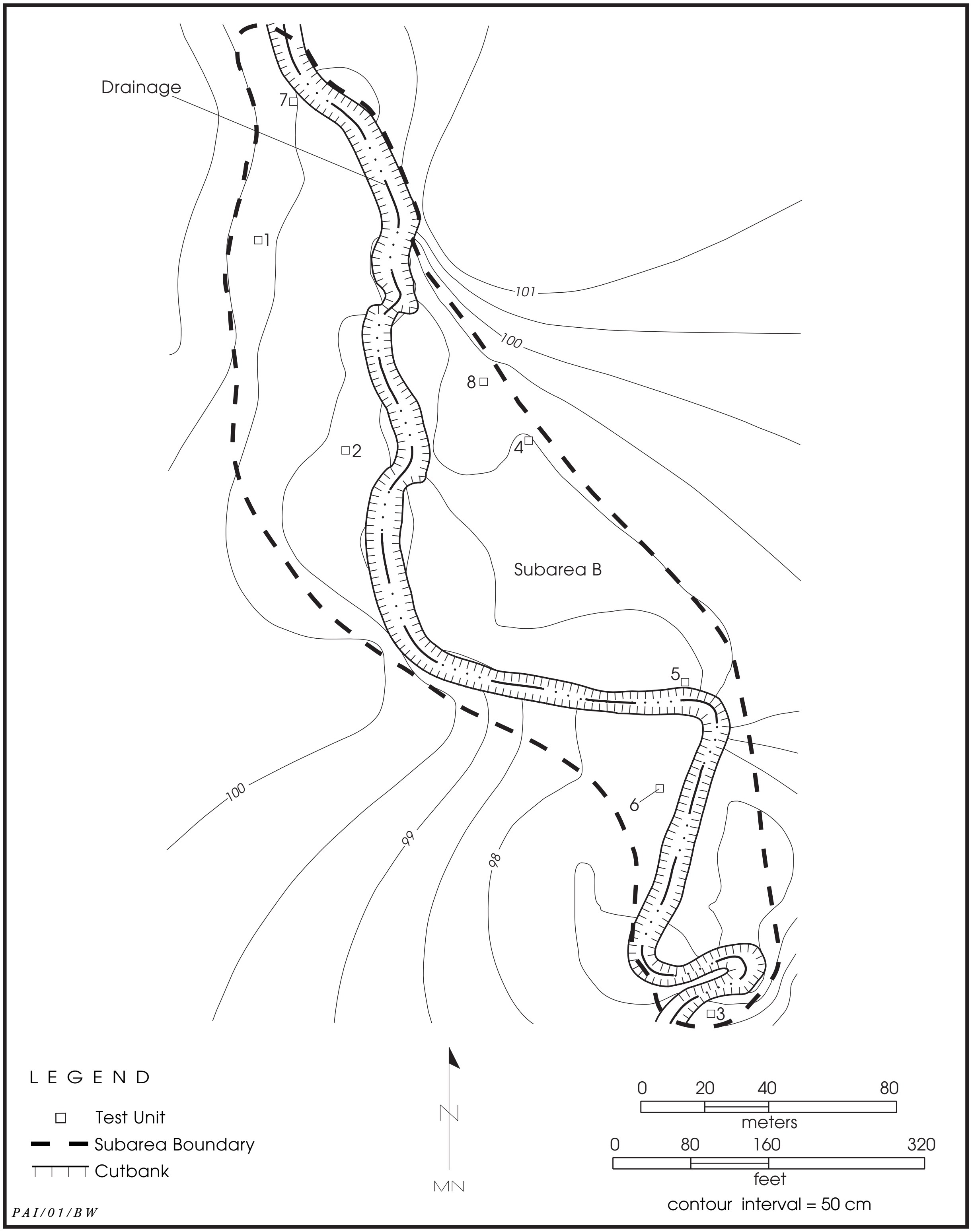

Figure 5.37. Site map of 41CV506-B.

edges of the terraces are well defined by the base of the upland slope. Although the terraces are present along the drainage beyond the site boundary to the north and south, past and present investigations indicate that 41CV506-B has maximum dimensions of 325 m north-south by 180 m east-west. Although buried artifacts occur from the surface to 130 cm, no stratigraphically discrete cultural components were encountered.

Sediments and Stratigraphy

The deposits were examined in the profiles of four test units, but only two are described below. These profiles reveal that the deposits consist primarily of dark loamy late Holocene alluvium with dispersed gravels. The deposits are probably equivalent to Nordt's (1992) West Range and Ford alluvia. In general, the alluvial deposits display A-Bw soil profiles.

The profiles of Test Units 1 and 4 are typical of the stratigraphy observed at the site. The profile of Test Unit 1 exhibits an A-Bw-Bw^2 soil profile. The A horizon (0–40 cm) is a black sandy clay loam, and the Bw horizon (40–68 cm) is a very dark grayish brown sandy clay loam. Both soil horizons contain less than 5 percent subrounded limestone gravels. The underlying Bw2 horizon (68–90+ cm) is a dark brown sandy clay loam with subangular (15 percent) limestone gravels.

The Test Unit 4 profile is imprinted with an A-B-Bw soil profile. The A horizon (0–60 cm) is a black sandy clay loam. The B horizon (60–110 cm) is a gravelly to very gravelly very dark grayish brown sandy clay loam. Subangular, granule- to pebble-sized limestone gravels are abundant (50 percent) from 60 to 76 cm but decrease in frequency (ca. 20 percent) from 76 to 110 cm. The underlying Bw horizon (110–122+ cm) is a gravelly brown sandy clay loam.

Cultural Materials

Almost 60 percent (n = 48 of 81) of the levels excavated from eight test units yielded cultural materials; only Test Unit 8 was culturally sterile (Table 5.19). Debitage dominates the artifact assemblage, and much of the material was intermixed with dense gravels or chert nodules.

Discussion

Four test units were excavated on the east bank of the tributary and four were excavated on the west terrace. Most of the cultural materials were intermixed with abundant limestone and chert gravels, indicating deposition in a high-energy fluvial environment. This evidence suggests that most—perhaps all—of the artifacts are redeposited or in seriously disturbed contexts. Based on the testing results, 41CV506-B is recommended as not eligible for listing in the National Register.

41CV580

Site Setting

Site 41CV580 is situated on a terrace and toeslope south of a meander in the Leon River. A two-track road and gully cross the site. The area is a lush riparian habitat that supports cedar elm, pecan, bois d'arc, and hackberry trees. Site elevation is 230 m above mean sea level.

Previous Work

This section describes past investigations at 41CV580 and 41CV1491. Although designated with two different site numbers, both were plotted in the same location and have similar site descriptions. A careful examination of the records indicates that they were, in fact, the same site.

Thomas (Fort Hood Archeological Society) first recorded 41CV580 on 2 March 1983. A site sketch map depicted its location. The site form noted that the Leon River was nearby, exposures were poor, and the area was looted. No site dimensions were given.

Mesrobian and Callum (Texas A&M University) monitored 41CV580 on 7 December 1987. The site was defined "by the area of disturbance and damage despite the absence of visible artifacts on the natural undisturbed surfaces." Looting at the west end of the site exposed mussel shells, burned rocks, and flakes. Extensive damage by bulldozers or bucket loaders was also noted. This area was considered a good location for a site, and the upper deposits contained dark, midden-like soil. The site measured 190x75 m, and looting, earth moving, and erosion affected 70 percent of the area.

Table 5.19. Summary of cultural materials from 41CV506-B, Test Units 1–7

Provenience	Early- to Middle-stage Bifaces	Side Scraper	Edge-modified Flakes	Core	Unmodified Debitage	Artifact Totals	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1								
Level 5 (40–50 cm)	–	–	–	–	1	1	–	–
Level 7 (60–70 cm)	–	–	–	1	7	8	–	–
Level 8 (70–80 cm)	–	–	–	–	4	4	–	–
Level 9 (80–90 cm)	–	–	–	–	6	6	–	–
Subtotals	0	0	0	1	18	19	0	0.00
TEST UNIT 2								
Level 5 (40–50 cm)	–	–	–	–	2	2	–	–
Level 6 (50–60 cm)	–	–	–	–	8	8	–	–
Level 7 (60–70 cm)	–	–	1	–	5	6	–	–
Level 8 (70–80 cm)	–	–	1	–	4	5	–	–
Level 11 (100–110 cm)	–	–	–	–	1	1	–	–
Subtotals	0	0	2	0	20	22	0	0.00
TEST UNIT 3								
Level 1 (0–10 cm)	1	–	–	–	5	6	–	–
Level 2 (10–20 cm)	–	–	–	–	3	3	–	–
Level 3 (20–30 cm)	–	–	–	–	2	2	–	–
Level 4 (30–40 cm)	–	–	–	–	5	5	–	–
Level 5 (40–50 cm)	–	–	–	–	5	5	–	–
Level 6 (50–60 cm)	–	–	–	–	6	6	–	–
Level 7 (60–70 cm)	–	–	–	–	3	3	–	–
Subtotals	1	0	0	0	29	30	0	0.00
TEST UNIT 4								
Level 1 (0–10 cm)	–	–	–	–	1	1	–	–
Level 3 (20–30 cm)	–	–	–	–	5	5	–	–
Level 4 (30–40 cm)	–	–	–	–	4	4	–	–
Level 5 (40–50 cm)	–	–	–	–	3	3	3	0.10
Level 6 (50–60 cm)	–	–	–	–	5	5	1	0.10
Level 7 (60–70 cm)	–	–	–	–	17	17	–	–
Level 8 (70–80 cm)	1	–	–	–	6	7	–	–
Level 9 (80–90 cm)	1	–	–	–	5	6	–	–
Level 10 (90–100 cm)	–	–	–	–	7	7	–	–
Level 11 (100–110 cm)	–	–	–	–	2	2	–	–
Level 12 (110–120 cm)	–	–	1	–	3	4	–	–
Level 13 (120–130 cm)	–	–	–	–	1	1	–	–
Subtotals	2	0	1	0	59	62	4	0.20
TEST UNIT 5								
Level 8 (70–80 cm)	–	–	–	–	1	1	–	–
Level 10 (90–100 cm)	–	–	–	–	8	8	–	–
Level 11 (100–110 cm)	–	–	–	–	11	11	–	–
Level 12 (110–120 cm)	–	–	–	–	6	6	–	–
Subtotals	0	0	0	0	26	26	0	0.00

Table 5.19, continued

Provenience	Early- to Middle-stage Bifaces	Side Scraper	Edge-modified Flakes	Core	Unmodified Debitage	Artifact Totals	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 6								
Level 3 (20–30 cm)	–	–	–	–	1	1	–	–
Level 4 (30–40 cm)	–	–	–	–	6	6	–	–
Level 5 (40–50 cm)	–	–	–	–	1	1	–	–
Level 6 (50–60 cm)	–	–	–	–	2	2	–	–
Level 7 (60–70 cm)	–	–	–	–	6	6	–	–
Level 8 (70–80 cm)	–	–	–	–	2	2	–	–
Level 9 (80–90 cm)	–	1	1	–	3	5	–	–
Level 10 (90–100 cm)	–	–	–	–	5	5	–	–
Level 11 (100–110 cm)	–	–	–	–	1	1	–	–
Subtotals	0	1	1	0	27	29	0	0.00
TEST UNIT 7								
Level 3 (20–30 cm)	–	–	–	–	1	1	–	–
Level 4 (30–40 cm)	–	–	–	–	1	1	–	–
Level 5 (40–50 cm)	–	–	–	–	10	10	–	–
Level 11 (100–110 cm)	–	–	–	–	1	1	–	–
Subtotals	0	0	0	0	13	13	0	0.00
Totals	3	1	4	1	192	201	4	0.20

Brown, Cargill, Kleinbach, Sanchez, Sandefur, and Vandersteen (Texas A&M University) recorded the site on 8 February 1990. At this time, the location was believed to be an undiscovered site and was designated 41CV1491. The site extended 50 m east-west by 45 m north-south and was characterized as an open camp consisting of lithic artifacts, bones, mussel shells, charcoal, burned rocks, and one piece of ground stone. These cultural materials were exposed in a road, in a looter's pothole, and on a looter's backdirt pile. Intact cultural deposits were present in the south wall of the looter's hole, located where the alluvial terrace abutted the base of the upland slope. The depth of deposits was up to 75 cm thick and consisted of an organic-rich loam. The road and looting disturbed an estimated 60 percent of the site (Carlson et al. 1994:67).

On 13 August 1997, Nordt (Baylor University) and Kleinbach (Prewitt and Associates) visited and evaluated 41CV1491 (Kleinbach 2000:273–275). Based on past and present investigations, the site dimensions were estimated to be at least 50x45 m, but the terrace extended east and west beyond the site boundaries, and researchers noted that the overall site size was possibly larger. The site was situated on the T_0 of the Leon River and an unnamed tributary. The terrace rose 5–6 m above the low-water channel of the stream. Ongoing sheet erosion was apparent along an east-west road that transected the site. The sediment appeared to exhibit an A-Bw or A-Bk profile consistent with the West Range alluvium (Nordt 1992). It was observed that a veneer of Ford alluvium may have once buried part of the site. Researchers estimated that the alluvial deposits at 41CV1491 could be several meters thick.

West Range alluviation began no earlier than 4000 B.P., and in many areas along the Leon River continued until 800–600 B.P. A period of soil development ensued toward the end of the West Range depositional episode. Deposition of Ford alluvium probably began after 600 B.P., burying the paleosol and the site. Researchers suggested that this buried horizon is equivalent to the Leon River paleosol identified at other sites in this drainage system (Mehalchick et al. 1999) and that the Ford veneer is historic in age.

In 1997, cultural materials similar to those noted in 1990 were observed in the road and the looted area, but less than 50 percent of the cultural deposits were thought to be disturbed. Because intact cultural deposits were relocated and examined, shovel testing was not warranted. Investigators noted that 41CV1491 had a high potential to contain intact archeological remains in a sealed, stratified context. Recommended testing to determine National Register eligibility consisted of a minimum of two trenches and 2–4 m^2 of manually excavated 1x1-m test units (Kleinbach 2000:274).

On 30 March 1999, Mehalchick, Kibler, and Killian (Prewitt and Associates) visited and evaluated 41CV580 (Killian and Kibler 2000: 156–159). Based on differing archeological potentials and geomorphic contexts, the site was divided into Subareas A and B.

Comprising 60 percent of the site area, Subarea A subsumed the T_0 of the Leon River that rose 5–6 m above the channel. It was relatively narrow (<25 m) where it abutted the valley wall, but widened to more than 80 m just west of the present site boundary. The terrace edge was slightly beveled and obscured by vegetation within the site area. A section of cutbank downstream from the site exposed two distinct fills separated by a buried soil. The two fills appeared to represent the West Range alluvium capped by Ford deposits and were separated by the Leon River paleosol. The Ford alluvium was approximately 1 m thick. No cultural materials were observed in Subarea A, but unmodified quartzite cobbles were noted. The subarea was affected on the south by a road, and on the north, by cutbank erosion.

Subarea B encompassed the toeslope that comprises the southern 40 percent of the site. A cross-cutting gully provided exposures of the toeslope deposits that consisted of an 80-cm-thick mantle of dark loamy sediments overlying clay and limestone. An A-C soil profile was imprinted on these sediments. Cultural materials exposed on looter's backdirt piles and in a roadcut consisted of mussel shells, unifaces, debitage, and burned rocks. Looting disturbed about 10 m^2 of the subarea to a maximum depth of 70 cm. Because Subareas A and B had the potential for buried cultural deposits, shovel testing was conducted at this time.

On Subarea A, one shovel test was placed about 5 m north of the roadcut and northwest of the looted area. Excavated to 80 cm, the shovel test was devoid of cultural materials. On Subarea B, one shovel test was excavated just south of the looter's hole. The test produced unmodified mussel shell umbos, bifaces, debitage, burned rocks, and a modified (drilled) mussel shell from the surface to 80 cm. The results indicated that Subareas A and B had the potential to contain intact, subsurface cultural deposits based on the depth of the Holocene deposits and presence of subsurface cultural materials. The recommended testing to determine National Register eligibility consisted of a minimum of two backhoe trenches and 4 m^2 of hand excavation on Subarea A and 4 m^2 of hand excavation on Subarea B (Killian and Kibler 2000:159).

Work Performed

A site file review was conducted for 41CV580 and 41CV1491, and both sites were determined to be in the same location. Because 41CV580 is the trinomial number originally assigned to this site location, 41CV1491 should no longer be the designation for this site. Also at this time, the subareas established in 1999 were reevaluated. Typically, subareas are not delineated at sites where only Holocene deposits with the potential to contain cultural deposits are present (e.g., separating a T_0 and T_1 surface into subareas, or as at this site, differentiating the toeslope and terrace). Portions of the toeslope consist of interfingering colluvial and alluvial sediments, and the entire site is encompassed in one landform and depositional unit. Therefore, the Subarea A and B designations at 41CV580 are considered irrelevant and are ignored herein.

On 29 June 2000, formal testing at 41CV580 was completed (Figure 5.38). The excavations consisted of three backhoe trenches (Backhoe Trenches 1–3), one 1.5x1.0-m test unit (Test Unit 1), and two 1x1-m test units (Test Units 2 and 3). A total of 5.53 m^3 was manually excavated.

A field inspection was conducted before excavations began. As noted by previous investigators, cultural materials were exposed in a looted area and in and along an eroding road. No archeological remains were observed in the Leon River cutbank or along the gully.

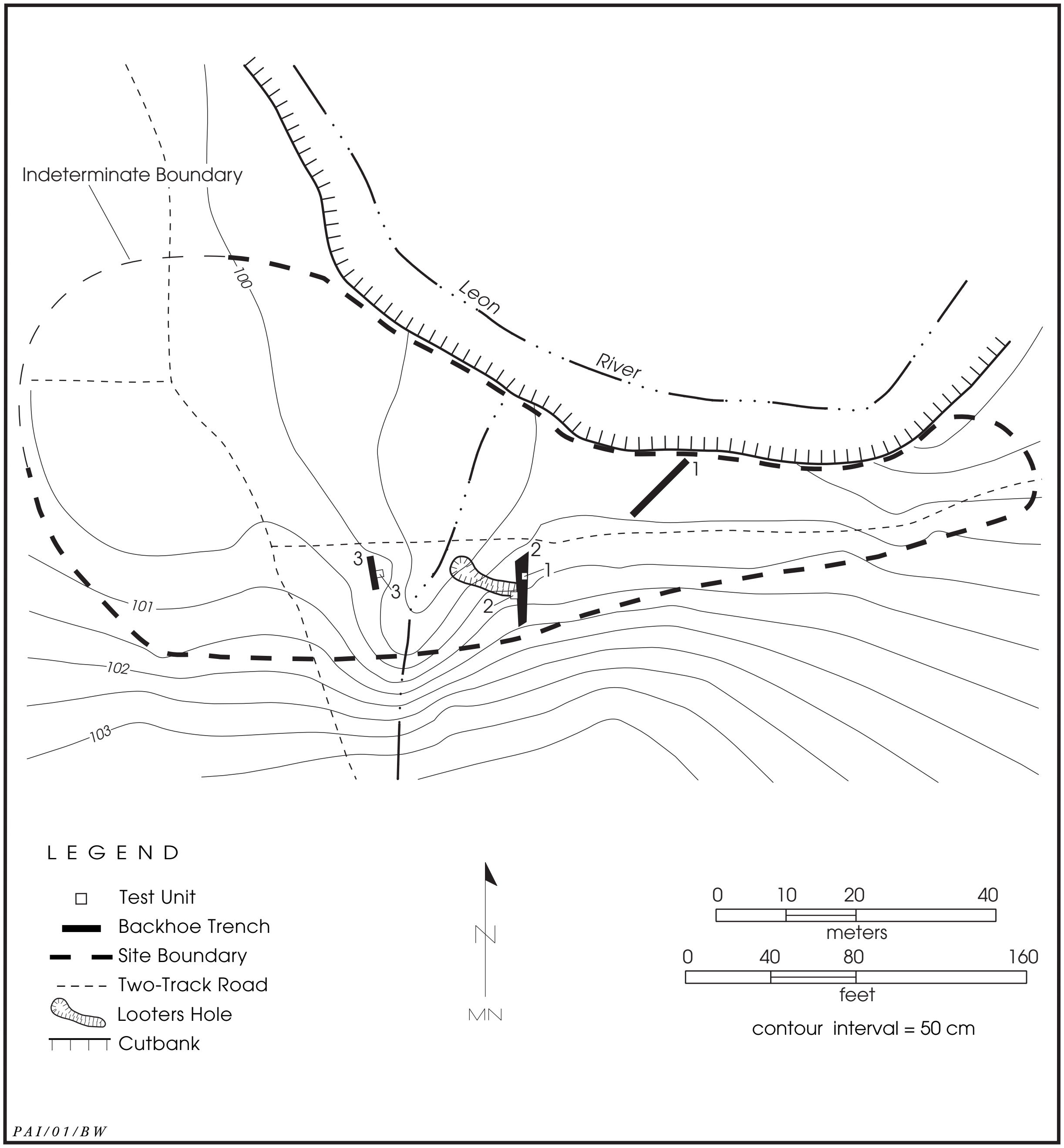

Figure 5.38. Site map of 41CV580.

The site size was redefined (ca. 140x55 m), although the western boundary is considered indefinite.

Backhoe Trench 1 was located on the terrace near the north-central site margin. The trench measured 10.0x0.7x2.8 m and exposed no cultural materials. Backhoe Trench 2 was excavated from the south edge of the road across the toeslope. Crossing the east edge of the looter's hole, the trench had maximum dimensions of 11.5x1.5x1.3 m. Burned rocks and mussel shells were visible between 50 and 120 cm throughout most of the trench. Backhoe Trench 3 was located approximately 20 m west of Backhoe Trench 2 and west of the gully. The north end of the trench was near the edge of the road where several mussel shells were exposed. Backhoe Trench 3 (6.0x0.7x2.0 m) exposed burned rocks and mussel shells between 20 and 130 cm.

Test Unit 1 was situated in the widest portion of Backhoe Trench 2 toward its north end. The upper 124 cm of deposits were removed during trenching, and the test unit excavation began at 124–130 cm. Because of heavy rains, Test Unit 1 was underwater for approximately one week, and the excavation had to be abandoned (ending at 178 cm) when the trench walls slumped. Excavated to an arbitrary depth of 200 cm, Test Unit 2 was placed along the west wall of Backhoe Trench 2 about 1.5 m upslope from (south of) Test Unit 1. At ca. 90 cm, the maximum east-west dimension of the test unit was increased to 110 cm to accommodate the inward slope of the trench's west wall. Test Unit 3 was placed along the east wall of Backhoe Trench 3 near its midpoint. This excavation was arbitrarily terminated at 270 cm.

Site Extent and Depth

The valley wall and Leon River delimit the site to the south and north, respectively. To the east, the terrace narrows considerably where the valley wall and river converge. To the west and northwest, however, the terrace and toeslope broaden and extend an unknown distance in this direction. Based on the landform and the testing results, the site measures at least 140 m east-west by 55 m north-south. Multiple prehistoric components are buried between 20 and 260 cm, and deeper cultural deposits may be present.

Sediments and Stratigraphy

Because the site is so close to the valley wall, the sediments and stratigraphy are characterized by late Holocene alluvium and colluvium. These deposits underlie two geomorphic surfaces: the floodplain of the Leon River or T_0 surface and the colluvial toeslope at the base of the valley wall. Backhoe Trench 1 exposed the deposits below the T_0 surface, which consist of channel fill and channel margin facies representing late Holocene Ford alluvium (Figure 5.39). These deposits are imprinted with a C-AC-C-C2 soil profile. The C horizon (0–69 cm) consists of a very pale brown very fine to fine sand and is estimated to be quite recent in age, based on the preservation of horizontally laminated sand beds and thin mud laminae throughout the horizon. The AC horizon (69–149 cm) is a dark grayish brown silty clay loam. Thin very fine sand beds are preserved throughout the horizon, as is a thin gravel bed at 103 cm below the surface. The C (149–196 cm) and C2 (196–271+ cm) horizons are dark grayish brown silty clay loams. Thin horizontal to contorted laminae of silts and muds are preserved throughout both horizons.

Deposits underlying the colluvial toeslope were examined in Backhoe Trench 2 and Test Unit 3. The profile of Backhoe Trench 2 consists of late Holocene colluvial and slopewash deposits imprinted with an A-Bw soil profile. The A horizon (0–56 cm) is a very dark gray clay loam, and the Bw horizon (56–150+ cm) is a very dark grayish brown clay loam. Angular to subangular matrix-supported gravels are common (5 percent increasing to 20 percent with depth) throughout both horizons, as are burned rocks and mussel shells. Radiocarbon dates reveal that the deposits observed in Backhoe Trench 2 accumulated over the last 4,000 years.

The profile of Test Unit 3 (0–260 cm) consists of a thin mantle of disturbed fill (0–17 cm) and late Holocene deposits of mixed colluvium and alluvium (17–243 cm) overlying West Range alluvium (243–260+ cm). The mixed alluvial and colluvial deposits contain 3–5 percent matrix-supported limestone gravels and are imprinted with an A-2Ab-2Bb-2Bwb soil profile. The A horizon (17–67 cm) is a very dark gray clay loam. The 2Ab horizon (67–112 cm) is a very dark gray silty clay loam that represents a buried soil horizon equivalent to the Leon River Paleosol (Mehalchick et al. 1999:215). Both soils contain mussel shells, burned rocks, and charcoal. The 2Bb horizon (112–195 cm) is a dark gray clay loam. The 2Bwb horizon (195–243 cm) is a grayish brown clay loam. Burned rocks mark the abrupt boundary between the overlying colluvial deposits and the underlying West Range alluvium and represent cultural debris on an ancient surface. The underlying 3Ab horizon (243–260+ cm) consists of a dark gray clay loam and represents the top of another buried soil.

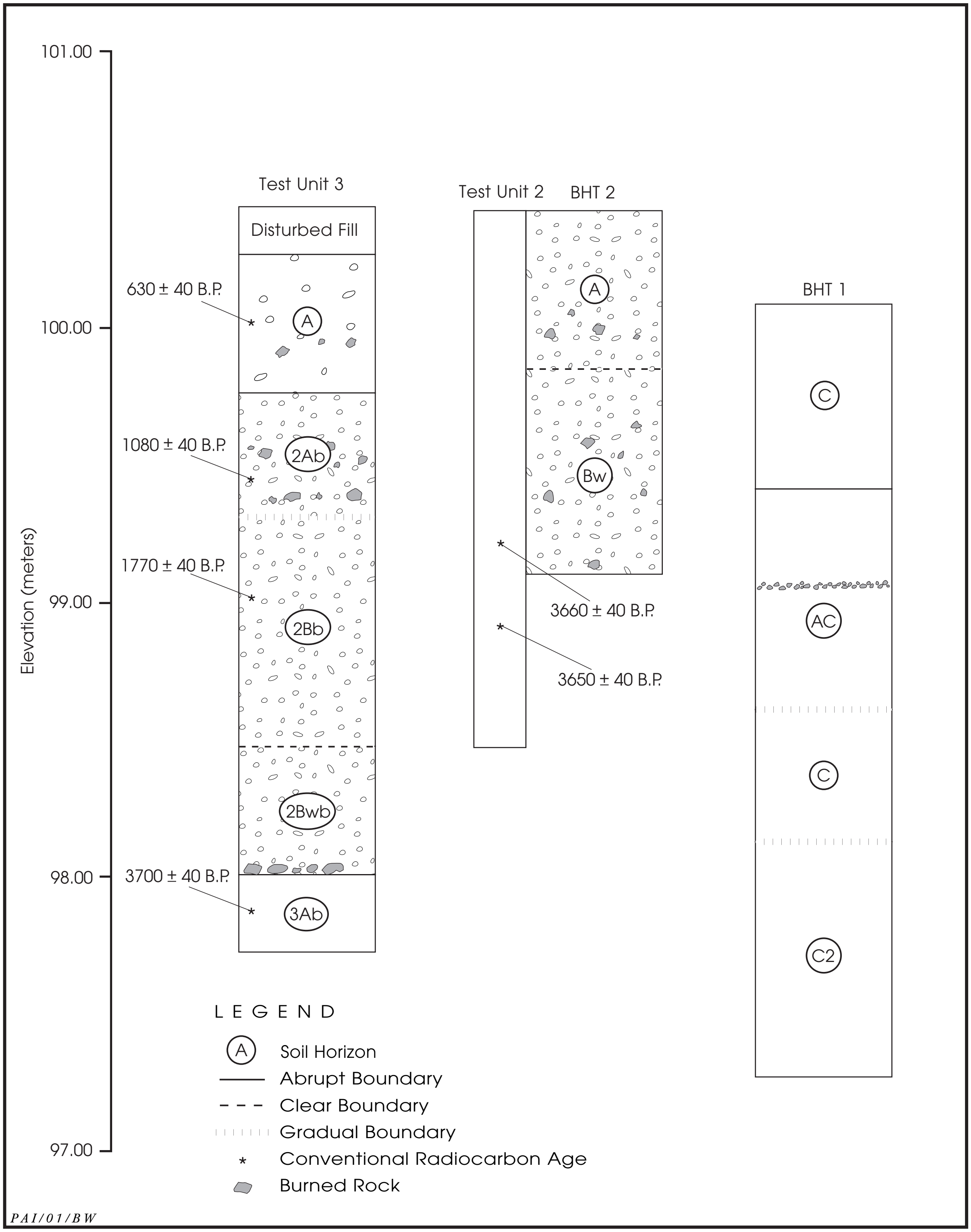

Figure 5.39. Profiles of Backhoe Trenches 1–2 and Test Unit 3, 41CV580.

Definition of Analysis Units

Based on the presence of different depositional units and separable prehistoric occupations, five analysis units are defined (Figure 5.40). Analysis Unit 1 includes an isolable archeological component buried in slopewash sediments, but the period these deposits represent is unknown. Analysis Units 2 and 3 correlate to dated, stratigraphically discrete cultural components encapsulated in separable A horizons. Subsuming two buried soils, Analysis Unit 4 corresponds to a dated cultural deposit occurring in an upper B horizon. Analysis Unit 5 consists of contemporaneous prehistoric occupations buried in Holocene colluvium and West Range alluvium.

Analysis Unit 1

Analysis Unit 1 subsumes the upper 90 cm of colluvium and slopewash in Test Unit 2. One buried component is identified at 40–70 cm based on concentrated cultural materials. Although the test unit adjoins Backhoe Trench 2, the profile is not consistent the entire length of the trench because of the natural slope of the landform. Because testing was limited, the extent of this buried component is not known.

Cultural Materials

From 0 to 70 cm, the north half of Test Unit 2 contained disturbed matrix from looting; this sediment was removed and not screened. The south half of the unit produced a small burned rock and a wire nail at 0–20 cm. Undisturbed fill from 20 to 90 cm yielded a variety of materials including stone tools, a core, debitage, burned rocks (4 kg), a cut *Amblema plicata* shell, spirally fractured Artiodactyla tibia fragments, and unmodified mussel shells (Table 5.20). Half of the mussel shells were identified as *Amblema plicata*. Seventy percent of the cultural materials occurred between 40 and 70 cm.

Discussion

Although some of the deposits in Test Unit 2 were destroyed by looting, intact cultural deposits were present in seven of nine levels excavated from Test Unit 2. Most of the materials, including all the stone tools and most of the mussel shells, occur in a 30-cm-thick deposit at the base of the A horizon. Albeit limited in quantity, the assemblage represents various activities, including lithic procurement and reduction, hunting, and acquisition of shellfish. Although no diagnostic artifacts or chronometric data are available, the stratigraphic position of this component indicates that it postdates the Middle Archaic period.

Analysis Unit 2

Analysis Unit 2 consists of the upper 70 cm of deposits in Test Unit 3 and Backhoe Trench 3. Based on a radiocarbon assay and concurrent peak in cultural materials, at least one discrete prehistoric component is buried at 30–60 cm.

Cultural Materials

In Test Unit 3, the upper 30 cm of deposits produced sparse debitage and faunal remains (Table 5.21). Dense cultural materials occurred from 30 to 60 cm; artifacts include a preform similar to a Cliffton arrow point, a modified *Odocoileus* sp. ulna, and two cut mussel shells (*Lapsilis teres* and *Quadrula* sp.). The modified deer ulna is a bone tool; most of the shaft was removed and modified into a rounded tip. Hundreds of unmodified mussel shells were scattered throughout the excavation in these levels, but many were concentrated in the east half of the unit. Ninety percent of the mussel shells consist of *Amblema*, *Lampsilis*, *Leptodea*, *Potamilus*, *Quadrula*, *Quincuncina*, and *Tritogonia* species; the rest are unidentifiable. Identified as *Celtis* sp. wood, charcoal collected at 40 cm yielded a conventional radiocarbon age of 630 ± 40 B.P. (Beta-149105). One flotation sample recovered at 40–50 cm contained Rosaceae, *Quercus* sp., and *Robinia pseudoacacia* wood, as well as *Vitis* sp. seeds. Cultural materials decreased dramatically at 60–70 cm.

Discussion

The Analysis Unit 2 cultural component is represented in Test Unit 3 as a 30-cm-thick zone of cultural materials clearly dominated by unmodified mussel shells. A calibrated radiocarbon date (2-sigma range) of A.D. 1290–1410 on charred hackberry wood and the recovery of an arrow point preform (possible Cliffton)

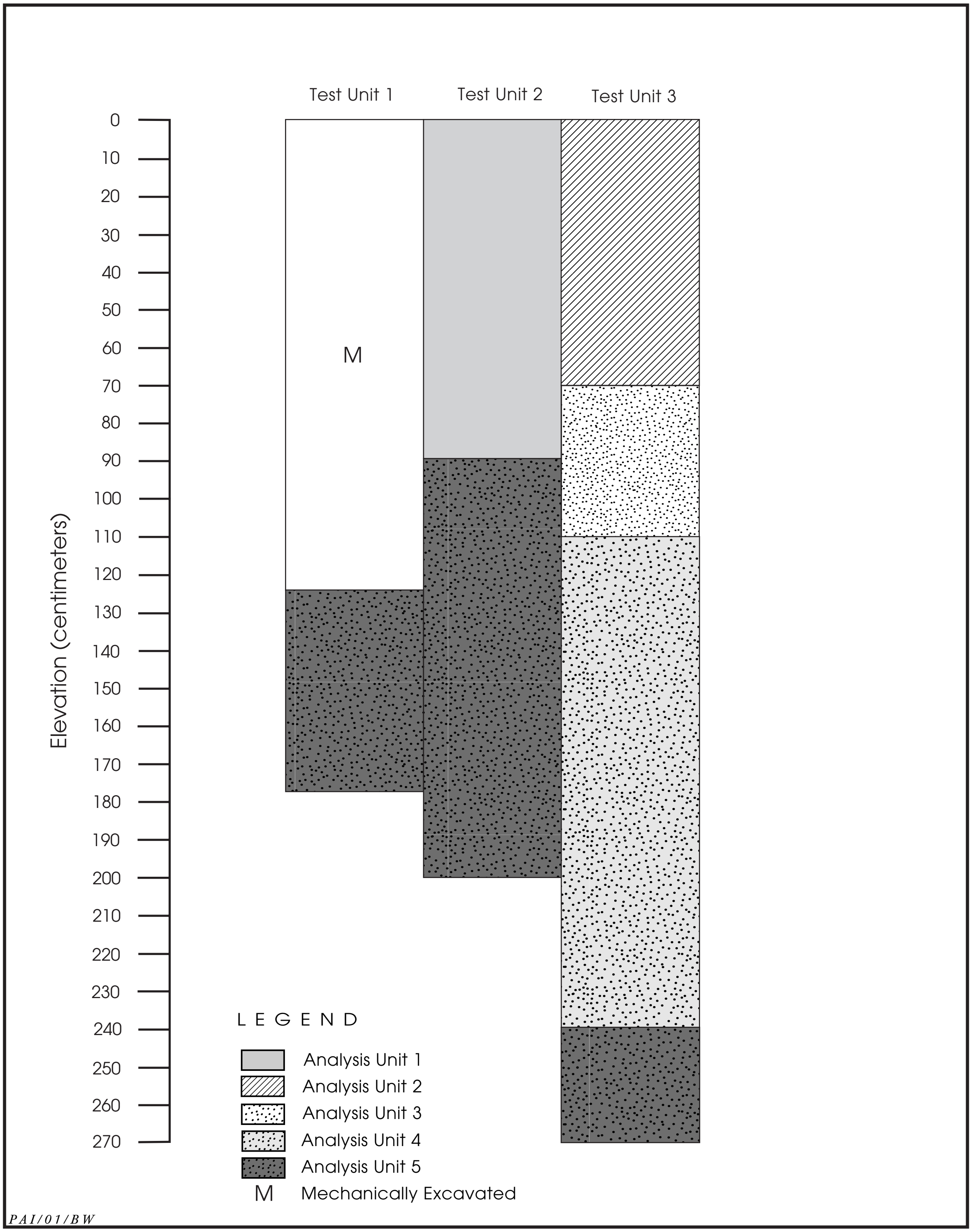

Figure 5.40. Excavation levels assigned to analysis units at 41CV580.

Table 5.20. Summary of cultural materials from 41CV580, Analysis Unit 1, Test Unit 2

Provenience	Early- to Middle-stage Biface	Late-stage to Finished Biface	Edge-modified Flakes	Core	Unmodified Debitage	Artifact Totals	Modified Mussel Shell	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 1 (0–10 cm)	–	–	–	–	–	0	–	–	–	1	0.10
Level 2 (10–20 cm)*	–	–	–	–	–	0	–	–	–	–	–
Level 3 (20–30 cm)	–	–	–	–	7	7	–	–	–	–	–
Level 4 (30–40 cm)	–	–	–	–	3	3	–	–	–	2	0.15
Level 5 (40–50 cm)	–	1	1	–	6	8	–	–	7	7	0.50
Level 6 (50–60 cm)	–	–	–	1	8	9	–	2	11	15	1.50
Level 7 (60–70 cm)	1	–	1	–	4	6	1	–	3	8	1.50
Level 8 (70–80 cm)	–	–	–	–	8	8	–	–	1	1	0.25
Level 9 (80–90 cm)	–	–	1	–	8	9	–	–	3	–	–
Totals	1	1	3	1	44	50	1	2	25	34	4.00

* A wire nail was recovered.

Table 5.21. Summary of cultural materials from 41CV580, Analysis Unit 2, Test Unit 3

Provenience	Arrow Point Preform	Miscellaneous Biface	Spokeshave	Unmodified Debitage	Hammerstone	Artifact Totals	Bone Tool	Modified Mussel Shells	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 2 (10–20 cm)	–	–	–	1	–	1	–	–	3	–	–	–
Level 3 (20–30 cm)	–	–	–	4	–	4	–	–	1	2	–	–
Level 4 (30–40 cm)	1	1	–	44	–	46	–	–	1	36	8	1.00
Level 5 (40–50 cm)	–	–	–	5	–	5	–	1	4	166	5	0.50
Level 6 (50–60 cm)	–	–	–	12	–	12	1	1	–	126	13	0.50
Level 7 (60–70 cm)	–	–	1	1	1	3	–	–	–	7	–	–
Totals	1	1	1	67	1	71	1	2	9	337	26	2.00

indicate a Late Prehistoric period, Toyah phase occupation. Stone tools and debitage are evidence of lithic reduction, as is a bone tool similar to a flaker or spatulate (Bell 1980; Jelks 1962; Prewitt 1982; Sorrow et al. 1967; Stephenson 1970). These bone implements have been recovered from sites in Oklahoma and Texas, are commonly manufactured from deer ulna, and may have been used for pressure flaking. Although recovered from Late Archaic and Late Prehistoric components, they are associated with Toyah phase occupations at the Kyle and Loeve-Fox sites (Jelks 1962; Prewitt 1982) and the Pictograph and Buzzard shelters (Stephenson 1970). Grape seeds, bone fragments, and several varieties of mussel shells represent food items. Because grapes ripen in early to midsummer, these remains provide evidence of seasonal occupation and activities. Specimens of cut shell suggest probable ornamental use. Although no discrete hearths were encountered, burned rocks and charred woods (i.e., oak, black locust, hackberry, and rose family) most likely represent byproducts of such cooking features.

Analysis Unit 3

Below Analysis Unit 2, the ca. 40-cm-thick 2Ab horizon in Test Unit 3 and Backhoe Trench 3 comprises Analysis Unit 3. One dated hearth and an associated cultural assemblage occur at 88–110 cm.

Cultural Materials

Cultural materials were present at 70–90 cm in Test Unit 3 (Table 5.22). Feature 3, a hearth, was present at 88–103 cm (see Cultural Features); the matrix around the feature at 90–110 cm produced some debitage and burned rocks but was dominated by vertebrate and invertebrate remains. The bone assemblage includes small to medium-sized and medium-sized to large Mammalia and medium-sized Artiodactyla, Emydidae, and *Sylvilagus* sp. remains. More than a third of the specimens are spirally fractured, but only four bones are charred. One spirally fractured, deer-sized metacarpal fragment is greasy, indicating that the well-preserved specimen still retains collagen. In addition, one metapodial fragment is from a fetal or neonatal deer-sized animal. Only 10 of 68 mussel shells (14.7 percent) are unidentifiable; the rest consist of *Amblema*, *Lampsilis*, *Leptodea*, *Potamilus*, *Quadrula*, *Quincuncina*, and *Tritogonia* species. One flotation sample collected from nonfeature sediment at 90–100 contained *Quercus* sp. and Salicaceae wood.

Cultural Features

Feature 3, a shallow, basin-shaped hearth, was encountered between 88 and 103 cm along the north-central portion of Test Unit 3 (Figure 5.41). The excavated portion of the hearth consisted of three layers of burned rocks (n = 76, 20.5 kg), most of which were tabular pieces of fossiliferous limestone. The feature had maximum excavated dimensions of 64 cm east-west by 59 cm north-south. It extended north beyond the limits of the test unit, and overall dimensions could not be estimated. Root intrusion was the only disturbance observed. The feature fill produced cultural materials consisting primarily of unmodified bones. Most of the bones were unidentifiable, but six medium-sized to large Mammalia fragments, a micro or small Mammalia, and three *Sylvilagus* sp. teeth and a *Sylvilagus* sp. mandible were identified. Three bones were spirally fractured, and five exhibited evidence of burning. Charcoal collected at 98 cm and identified as indeterminate hardwood yielded a conventional radiocarbon age of 1080 ± 40 B.P. (Beta-149106). One flotation sample yielded *Sapindus saponaria*, and *Carya*, *Celtis*, and *Quercus* spp. wood, in addition to *Quercus* sp. acorns.

Discussion

A basin-shaped hearth and associated materials found within a 20-cm-thick zone in Test Unit 3 represent the Analysis Unit 3 cultural component. A calibrated radiocarbon date (2-sigma range) of A.D. 890–1020 obtained on feature charcoal reveals use of the area during the Late Prehistoric period, Austin phase. Vertebrate and invertebrate faunal remains in the cultural assemblage include canid- to deer-sized mammals, cottontail rabbits, box or water turtles, and mussel shells. All of the spirally fractured remains are canid- to deer-sized bones, suggesting breakage for grease or marrow processing. Although limited in number, oak

Table 5.22. Summary of cultural materials from 41CV580, Analysis Unit 3, Test Unit 3

Provenience	Unmodified Debitage	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 8 (70–80 cm)	1	2	2	15	0.25
Level 9 (80–90 cm)	2	1	3	2	0.25
Feature 3 (88–103 cm)	4	44	4	76	20.50
Level 10 (90–100 cm)	5	25	37	30	6.00
Level 11 (100–110 cm)	4	1	22	38	3.25
Totals	16	73	68	161	30.25

acorns may have been processed for food, and the faunal remains demonstrate the use of terrestrial and aquatic resources. Fuel wood consists of willow family, oak, soapberry, hickory, and hackberry. The season for this component cannot be established reliably, but the recovery of a fetal or neonatal, deer-sized element would suggest a late fall to spring occupation based on the breeding season and gestation period (December to June) for white-tailed deer (Davis 1974:258–259). Also, oak acorns ripen and were most likely harvested in the fall, although these can be processed and consumed at a later time.

Analysis Unit 4

From 110 to 240 cm, Analysis Unit 4 subsumes the 2Bb and 2Bwb deposits that are ca. 130 cm thick in Test Unit 3 and Backhoe Trench 3. Based on distribution of artifacts and a radiocarbon assay, one prehistoric component is represented by cultural materials recovered from 110 to 240 cm (most at 110–140 cm).

Cultural Materials

Each level from 110 to 140 cm in Test Unit 3 produced high quantities of cultural materials, consisting mainly of burned rocks and unmodified mussel shells (Table 5.23). Identified vertebrate taxa consist of medium-sized to large Mammalia, medium Artiodactyla, Emydidae, Testudinata, and *Odocoileus* sp. elements. Slightly less than half (n = 21) of the bone assemblage is spirally fractured, and one canid- to deer-sized longbone exhibits periostitis. Almost half (n = 44) of the identified mussel shells are *Amblema plicata*. Charcoal collected at 140 cm yielded a conventional radiocarbon age of 1770 ± 40 B.P. (Beta-149108). At 140–170 cm, artifact counts decreased from the preceding levels, and few cultural materials were found from 170 to 240 cm.

Discussion

Although cultural materials occur in each level excavated from 110 to 240 cm in Test Unit 3, most are concentrated in the upper 30 cm of the 2Bb horizon. At the base of this cultural deposit, a calibrated radiocarbon date (2-sigma range) of A.D. 140–380 corresponds to a Late Archaic occupation. Although mussel shells are the most common cultural debris, nearly equal numbers of bones and debitage occur in the assemblage. Canid- to deer-sized mammals, deer, and turtles comprise the identifiable vertebrate remains. Most of the spirally fractured specimens are deer-sized, suggesting intentional breakage for marrow extraction. The vertebrate remains, along with mussel shells and box or water turtle fragments, reveal exploitation of terrestrial and riverine resources.

Analysis Unit 5

Analysis Unit 5 consists of late Holocene slopewash sediments between 134 and 178 cm in Test Unit 1 and 90 and 200 cm in Test Unit 2, excavated beside Backhoe Trench 2, along with alluvial deposits from 240 to 270 cm in Test Unit 3 and Backhoe Trench 3. Burned rock midden deposits were sampled in Test Units 1 and 2, and two hearths were excavated in Test Units 2 and 3. Two radiocarbon dates from the burned rock midden in Test Unit 2 reveal use of the area during the Middle Archaic period.

Cultural Materials

Cultural materials were scattered throughout Test Unit 1 from 124 to 150 cm (Table 5.24). Feature 1, a burned rock midden, was present at 140–178 cm (see Cultural Features).

In Test Unit 2, Features 2 (a burned rock midden) and 4 (a hearth) were encountered at 89–157 cm and 172–187 cm (see Cultural Features). At 90–160 cm, the matrix around Feature 2 produced cores, flakes, unmodified mussel shells, and burned rocks. Stone artifacts, unmodified mussel shells, and burned rocks were recovered from the general level sediment at 160–200 cm.

At 240–260 cm, Test Unit 3 contained 13 flakes, 75 burned rocks (24 kg), and charcoal. Many rocks were tabular pieces and larger slabs (up to 18x16x5 cm). Although no patterning was apparent, several rocks were clustered in the southwest corner and extended beyond the edge of the unit. Charcoal collected at 258 cm yielded a conventional radiocarbon age of 3700 ± 40 B.P. (Beta-149111). Recovered at 250–260 cm, one flotation sample contained *Quercus* sp. and Salicaceae wood. Ten burned rocks (3.5 kg) were found at 260–270 cm.

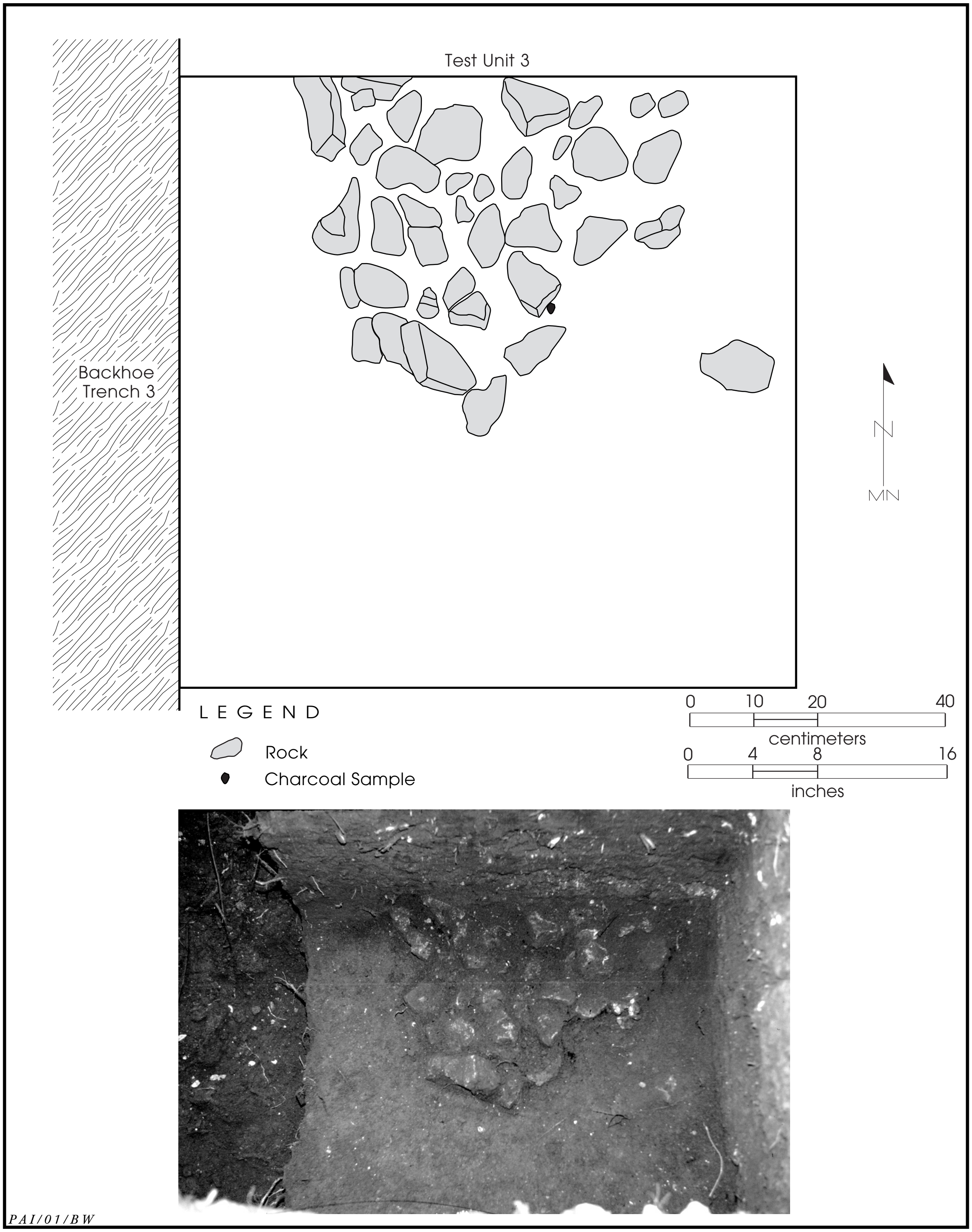

Figure 5.41. Plan and photograph of Feature 3 in Test Unit 3, Analysis Unit 3, 41CV580.

Table 5.23. Summary of cultural materials from 41CV580, Analysis Unit 4, Test Unit 3

Provenience	Late-stage to Finished Bifaces	Graver/Burin	Edge-modified Flake	Core	Unmodified Debitage	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Level 12 (110–120 cm)	1	–	–	–	8	9	4	36	36	3.00
Level 13 (120–130 cm)	–	–	–	–	8	8	19	48	37	7.25
Level 14 (130–140 cm)	–	1	–	–	22	23	22	19	40	4.50
Level 15 (140–150 cm)	–	–	–	–	–	0	–	17	16	1.50
Level 16 (150–160 cm)	–	–	–	–	3	3	1	9	6	2.00
Level 17 (160–170 cm)	–	–	–	–	–	0	–	2	9	3.00
Level 18 (170–180 cm)	–	–	–	–	–	0	–	–	1	0.25
Level 19 (180–190 cm)	–	–	–	1	–	1	–	–	6	1.50
Level 20 (190–200 cm)	–	–	1	–	4	5	–	–	2	0.25
Level 21 (200–210 cm)	–	–	–	–	–	0	–	–	1	0.25
Level 22 (210–220 cm)	1	–	–	–	–	1	–	1	1	0.25
Level 23 (220–230 cm)	–	–	–	–	–	0	–	–	2	0.25
Level 24 (230–240 cm)	–	–	–	–	–	0	–	–	13	3.00
Totals	2	1	1	1	45	50	46	132	170	27.00

Cultural Features

At 140 cm, large burned rocks in the southern two-thirds of Test Unit 1 were designated Feature 1, a burned rock midden. The feature extended to 178 cm, occurred across the entire unit with depth, and sloped gradually from south to north. The feature consisted of several rock layers and was 20–25 cm thick. Approximately 70 percent of the burned rocks were tabular fragments 5–15 cm in size, with the rest being smaller, angular fragments (20 percent) and slabs (10 percent) up to 20x15x5 cm. About 75 percent of the rocks were fossiliferous limestone, and many were fractured in place or highly friable. Debitage and faunal remains were recovered from the midden, and two flotation samples produced *Acer*, *Carya, Celtis*, and *Quercus* spp. wood. Roots minimally disturbed the feature. Based on the excavation results and the trench exposure, the midden measures at least 3 m north-south by 2 m east-west but could be much larger.

Feature 2, also a burned rock midden, was encountered at 89 cm in the southwest portion of Test Unit 2. As with Feature 1 in Test Unit 1, Feature 2 sloped gradually from south to north and encroached across the unit with depth. Present between 89 and 157 cm, Feature 2 produced cultural materials similar to those found in Feature 1, and the two are probably part of the same midden deposit. Feature 2 consisted of several layers of fossiliferous limestone rocks. Approximately 75 percent were angular, fist-sized and larger pieces, with most extremely blocky and up to 10 cm thick. The remainder consisted of tabular pieces up to 24x13x5 cm in size. Small and medium-sized roots, along with small amounts of colluvially derived unburned rocks and gravels, were noted as disturbances. Charcoal collected at 120 cm and 150 cm yielded conventional radiocarbon dates of 3660 ± 40 B.P. (Beta-149107) and 3650 ± 40 B.P. (Beta-149109), respectively. The deeper charcoal sample was identified as *Quercus* sp. wood. Three flotation samples yielded wood of eight taxa—*Cercis canadensis* var. *texensis*, *Carya*, *Celtis*, *Diospyros*, *Quercus* and *Ulmus* spp., and Rosaceae and Salicaceae, as well as *Asclepias* sp. seeds and *Quercus* sp. acorns.

Feature 4, a basin-shaped hearth, was present from 172 to 187 cm in Test Unit 2 (Figure 5.42). Well defined along the east wall near the center of the unit, the hearth consisted of two to

Table 5.24. Summary of cultural materials from 41CV580, Analysis Unit 5, Test Units 1–3

Provenience	Early- to Middle-stage Biface	Edge-modified Flake	Cores	Unmodified Debitage	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1									
Level 13 (124–130 cm)	–	–	–	–	0	–	–	3	0.25
Level 14 (130–140 cm)	–	–	–	3	3	–	1	29	2.00
Level 15 (140–150 cm)	–	–	–	–	0	–	2	48	4.50
Subtotals	0	0	0	3	3	0	3	80	6.75
Feature 1 (140–178 cm)	–	–	–	8	8	5	29	597	305.50
TEST UNIT 2									
Level 10 (90–100 cm)	–	–	–	3	3	–	3	33	1.50
Level 11 (100–110 cm)	–	–	1	3	4	–	7	10	2.00
Level 12 (110–120 cm)	–	–	–	–	0	–	2	2	0.25
Level 14 (136–140 cm)	–	–	1	–	1	–	2	4	0.25
Level 15 (140–150 cm)	–	–	2	1	3	–	4	10	2.00
Level 16 (150–160 cm)	–	–	1	10	11	–	15	7	1.00
Level 17 (160–170 cm)	–	–	–	9	9	–	11	3	0.25
Level 18 (170–180 cm)	1	–	–	3	4	–	3	6	1.00
Level 19 (180–190 cm)	–	–	–	28	28	–	6	5	1.00
Level 20 (190–200 cm)	–	1	–	5	6	–	1	23	4.00
Subtotals	1	1	5	62	69	0	54	103	13.25
Feature 2 (89–157 cm)	–	–	–	31	31	–	19	1,255	318.00
Feature 4 (172–187 cm)	–	–	–	3	3	7	1	45	14.50
Subtotals	0	0	0	34	34	7	20	1,300	332.50
TEST UNIT 3									
Level 25 (240–250 cm)	–	–	–	9	9	–	–	38	13.00
Level 26 (250–260 cm)	–	–	–	4	4	–	–	37	11.00
Level 27 (260–270 cm)	–	–	–	–	0	–	–	10	3.50
Subtotals	0	0	0	13	13	0	0	85	27.50
Totals	1	1	5	120	127	12	106	2,165	685.50

three layers of imbricated, densely packed burned rocks (n = 45, 14.5 kg). All of the rocks were fossiliferous limestone, and several were fractured in situ. About 80 percent were thin (2–5 cm thick), tabular pieces, with the largest measuring 18x12x5 cm; the rest consisted of angular and subangular, fist-sized pieces. A few rocks delimiting the west edge of the hearth were angled and sloped toward the center of the feature; one interior rock was vertical. Although the hearth has maximum excavated dimensions of 50 cm north-south by 42 cm east-west, it continues east beyond the limits of the test unit. Its overall dimensions are not known, but it appears that approximately three quarters of an ovate hearth was excavated. No evidence of disturbance was apparent. The feature fill produced sparse cultural materials. The matrix just above and between the burned rocks was charcoal stained, but the base of the hearth was intrusive into very gravelly sediment. Submitted for radiocarbon assay, one charcoal sample was too small to be adequately dated. One flotation sample contained *Quercus* sp. wood, and a

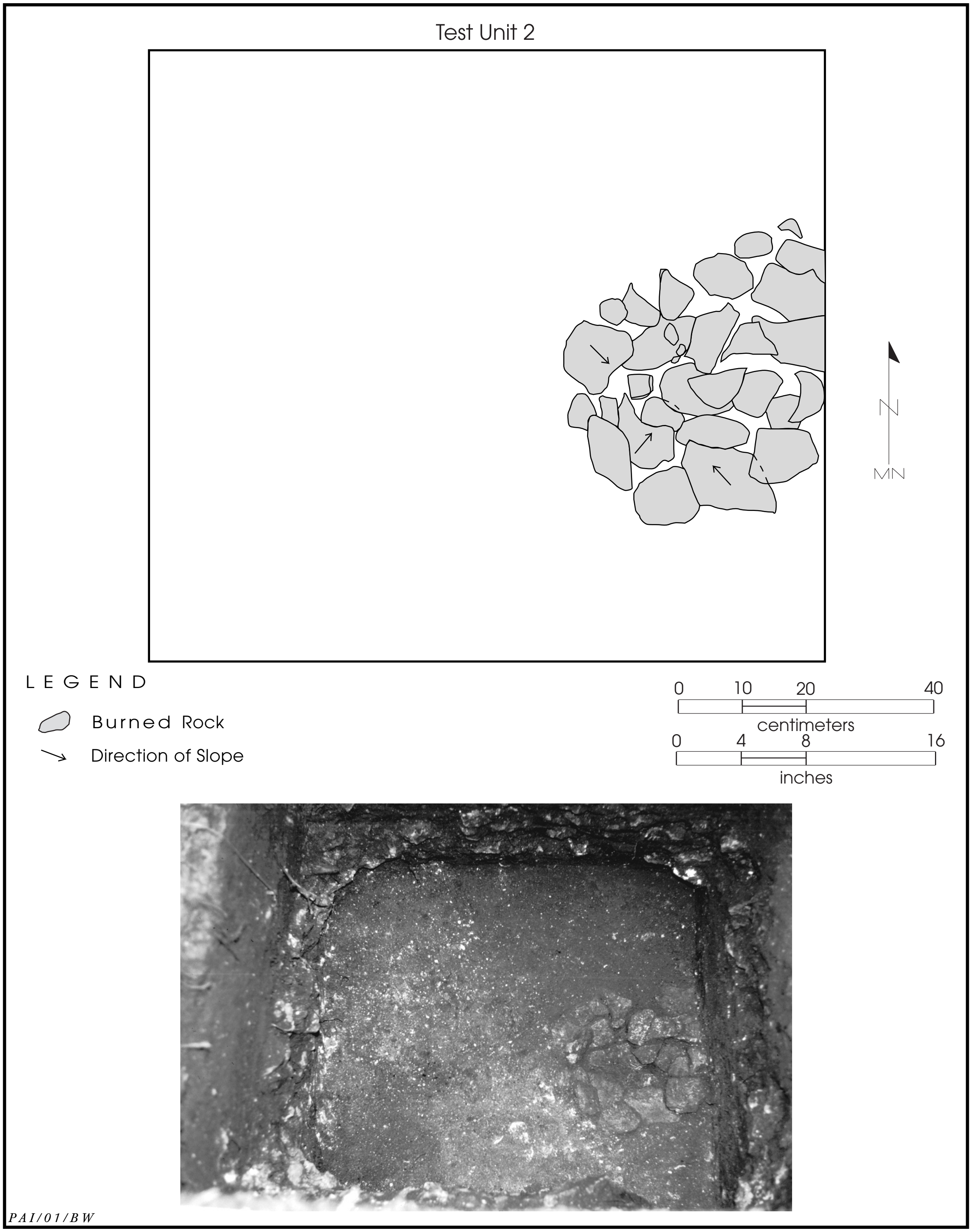

Figure 5.42. Plan and photograph of Feature 4 in Test Unit 2, Analysis Unit 5, 41CV580.

second sample did not produce charred macrobotanical remains.

Discussion

Buried in a Bw horizon consisting of slopewash and colluvium, Features 1 and 2 are probably separate exposures of one laterally extensive burned rock midden deposit. The features are 25–35 cm thick but vary in depth because of the natural slope of the deposits from south to north. Calibrated radiocarbon dates (2-sigma range) of 2140–1920 B.C. and 2140–1910 B.C. from Feature 2 correlate to a Middle Archaic component. These almost identical dates were obtained from near the top and bottom of the feature and probably reflect displacement and jumbling of the midden deposits during multiple-use episodes. Aside from burned rocks, most of the cultural assemblage from the middens consists of mussel shells, debitage, and cores. Several fuel woods—maple or boxelder, hickory, hackberry, Texas redbud, persimmon, oak, and elm, along with rose and willow families—are identified. Edible plant remains recovered from midden contexts consist of milkweed seeds and oak acorns, which ripen in midsummer and fall. Nonetheless, acorn processing would extend their shelf life beyond their normal seasonal availability, and midden deposits themselves result from multiple cooking events that could represent different seasons.

Approximately 20 m west of the Features 1 and 2, a 20-cm-thick lens of cultural materials with a preponderance of burned rocks is buried in West Range alluvium (Test Unit 3 and Backhoe Trench 3). Thermally altered rocks, combined with oak and willow family wood, indicate cooking. A calibrated radiocarbon date (2-sigma range) of 2200–1960 B.C. reveals use during the Middle Archaic period. The overlapping dates demonstrate that this living surface is contemporaneous with the Feature 2 midden.

Finally, Feature 4, a discrete hearth, is present approximately 15 cm below the base of Feature 2. Although no relative or absolute dates are available, this feature probably corresponds to the Middle Archaic period based on its stratigraphic position (Bw horizon). Associated cultural materials are sparse, and the only identifiable charcoal is oak wood.

Summary and Conclusions

Spanning the Middle Archaic period to the Toyah phase of the Late Prehistoric period, a series of radiocarbon dates from 2200 B.C. to A.D. 1410 demonstrates that 41CV580 was occupied repeatedly for at least 3,600 years. Dated occupations include discrete lenses of cultural materials, hearths, and burned rock middens buried in colluvium and alluvium preserved in a narrow terrace and toeslope along the valley wall on the south side of the Leon River. Deposits exposed in Backhoe Trench 1 represent an inset fill of Ford alluvium near the river, and sediments in Backhoe Trenches 2 and 3 represent West Range alluvial and colluvial deposits closer to the valley wall.

The 270-cm-thick exposure of colluvial and alluvial deposits and the radiocarbon-dated charcoal samples in Test Unit 3 tell an interesting story (Figure 5.43). Radiocarbon ages on wood charcoal from the 2Ab and 2Bb horizons (67–195 cm) in Test Unit 3 indicate that these zones represent the Leon River paleosol imprinted onto the colluvial and alluvial deposits. The Leon River paleosol is a thick cumulic soil formed on the West Range floodplain alluvium throughout the Leon River valley as it flows through and circumscribes the northern border of Fort Hood (see Mehalchick et al. 1999:215). As expressed at 41CV580, this soil mantles the valley toeslope and provides further evidence of a period of widespread landscape stability across the valley's riparian zone and slopes ca. 1,000–1,500 years ago. Another, deeper buried soil—the 3Ab horizon (243–260+ cm)—contains cultural debris that marks an abrupt boundary between the overlying colluvial and alluvial deposits and the underlying West Range alluvium. The top of this cumulic soil represents an ancient stable surface that was occupied around 3,700 years ago.

A comparison of the elevational differences between stratigraphic and occupation zones (i.e., analysis units) in Test Units 1–3 suggests that the Test Unit 3 sediments represent fill deposited in a large gully that was formed by ca. 4000 B.P. An examination of the stratigraphy and radiocarbon dates in Test Unit 3 suggests some minor variations in the rates of deposition through time (Figure 5.44). During the 1,900 years from 3700 to 1770 B.P., the gully filled slowly with colluvial and alluvial sediments. The rate of

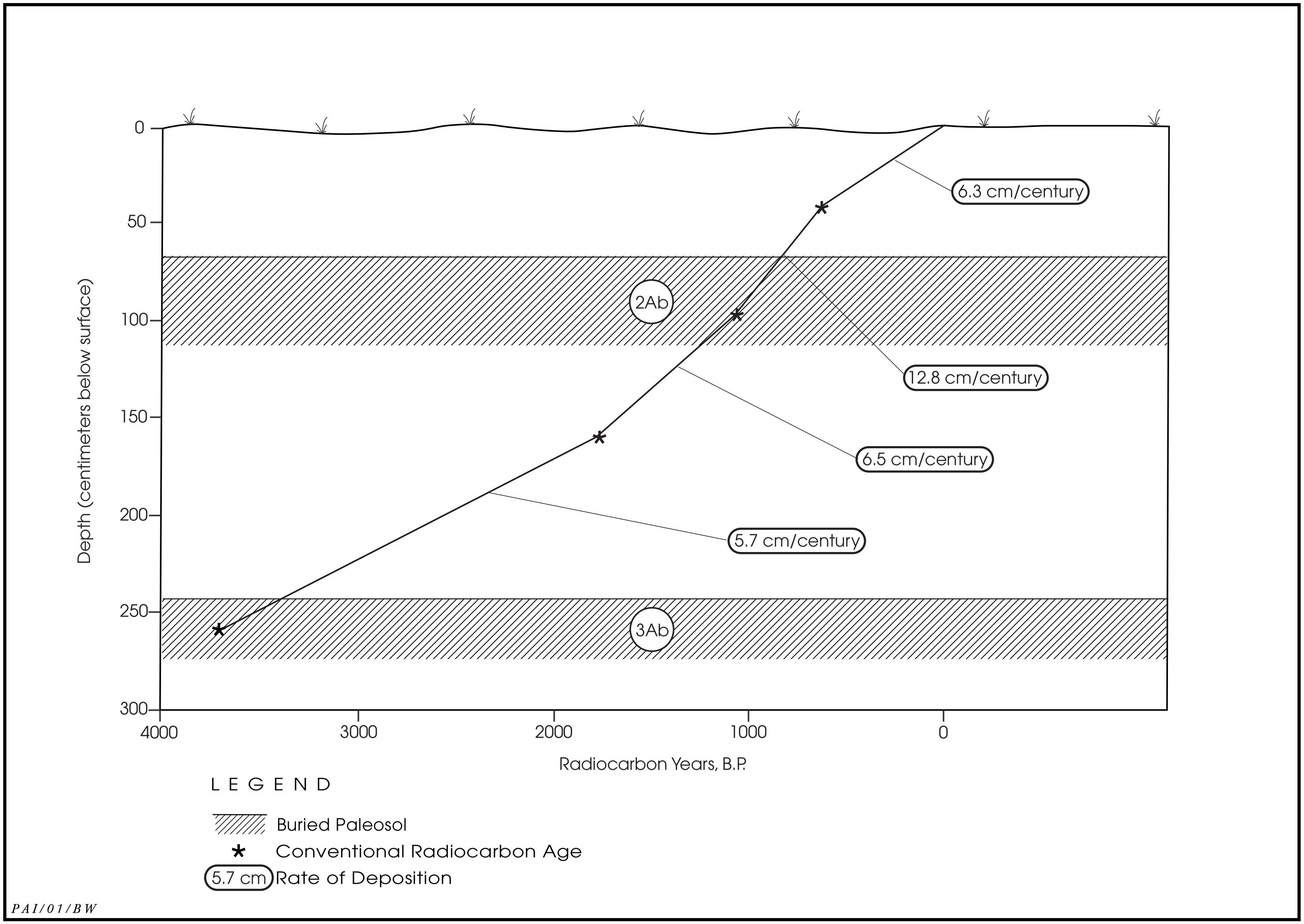

Figure 5.43. Rates of deposition for 41CV580 based on stratigraphy and radiocarbon dates in Test Unit 3.

deposition increased very slightly at around 1770 B.P. and then increased again from around 1080 to 630 B.P. This evidence seems consistent with data from the other locales throughout the Leon River valley and elsewhere at Fort Hood. The evidence suggests that the late Holocene can be characterized as a time of widespread landscape stability that succeeded a period of severe erosion during the middle Holocene. Although it is not known precisely when the gully formed at 41CV580, its formation sometime before 3,700 years ago coincides with this erosional period. At around 1000 B.P. the period of landscape stability ended as the smaller drainages throughout Fort Hood down cut, delivering increased sediment loads to the major trunk streams such as the Leon River, which in turn buried the former stable floodplain surface through overbank flooding. This period is marked by the formation of the Leon River paleosol in the Leon River drainage (see Mehalchick et al. 1999:213–215; Mehalchick, Killian, Caran, et al. 2000:197–200; Nordt et al. 1994).

Cultural deposits encountered in Test Units 1–3 were divided into five analysis units (see Figure 5.44). These deposits yielded a variety of features and artifacts, but burned rocks and mussel shells were represented in the greatest numbers (Table 5.25). Although 2,556 burned rocks (748.5 kg) were found at the site, middens corresponding to the Middle Archaic period account for approximately 75 percent of this amount (85 percent by weight). Interestingly, no ground stone was recovered from the excavations. There are 13 mussel shell taxa present, and 20 percent of the remains are unidentifiable. Half of the mussel shell assemblage is associated with the Toyah phase component (Table 5.26). *Amblema plicata* (threeridge) accounts for 43.4 percent (n = 290) of the invertebrate assemblage and is the most common identified species during each time period. Threeridges usually occur in large floodplain pools of mainstream habitats, can endure drought by burrowing, and possibly tolerate lower quality water that may limit other species (Howells et al. 1996; Neck and Lintz 1993). Of the mussel shells, 668 are unmodified, and 3 specimens show modifications. These are cut mussel shells that may represent waste debris from the manufacture of shell ornaments or tools.

Nine taxa are present in the vertebrate assemblage, and slightly more than half are unidentifiable fragments (Table 5.27). The remainder consist of aquatic and land species, with canid- to deer-sized mammals comprising 35 percent of the specimens. Thirty-six of 39 spirally fractured elements are deer-sized animals; these elements would typically be broken for marrow extraction. Fifty-one and 32 percent of the elements occur with the Austin phase and Late Archaic occupations, respectively. In addition to the 142 unmodified bones, a deer ulna tool is associated with the Toyah phase occupations.

Preservation of floral remains was excellent. Ten wood taxa and 3 edible plant species were identified, with the greatest variety occurring in the Middle Archaic midden deposits. The macrobotanical remains, coupled with the faunal assemblage, are an indication of the available riparian resources. Although inconclusive, some of the flora (such as seeds and acorns) and fauna (a fetal or neonatal deer) hint at summer and fall encampments. These seasonal indicators are present in the Middle Archaic and Late Prehistoric periods.

The modified stone artifacts are roughly consistent in most of the assemblages and are represented by varying combinations of modified flake tools, bifaces, and cores (see Table 5.25). Two notable deviations from this trend include the Austin phase component, which had no tools, and the Middle Archaic period, which is dominated by cores.

Overall, the unmodified flake assemblage exhibits relatively high percentages of cortical debitage, with the Toyah phase and Middle Archaic having the highest percentages (67.2 and 52.5 respectively). Size grades also vary consistently across time, yielding high frequencies of debitage in the 0.5–1.0 inch and the 1.0–1.5 inch size grades. The combination of high cortex percentages with larger average flake size suggests the site is on or close to a chert resource and that early stage reduction activities are represented by the debitage recovered. A qualitative examination of striking platforms on flakes from all five analysis units revealed cortical, single facet, and multifaceted platforms supporting the proposition of diversity of lithic reduction activities at the site, including early-stage biface production, flake blank production, and middle- to late-stage biface production.

Of the known chert types on Fort Hood, those from the North Fort Chert Province (including Fort Hood Gray, Fort Hood Yellow,

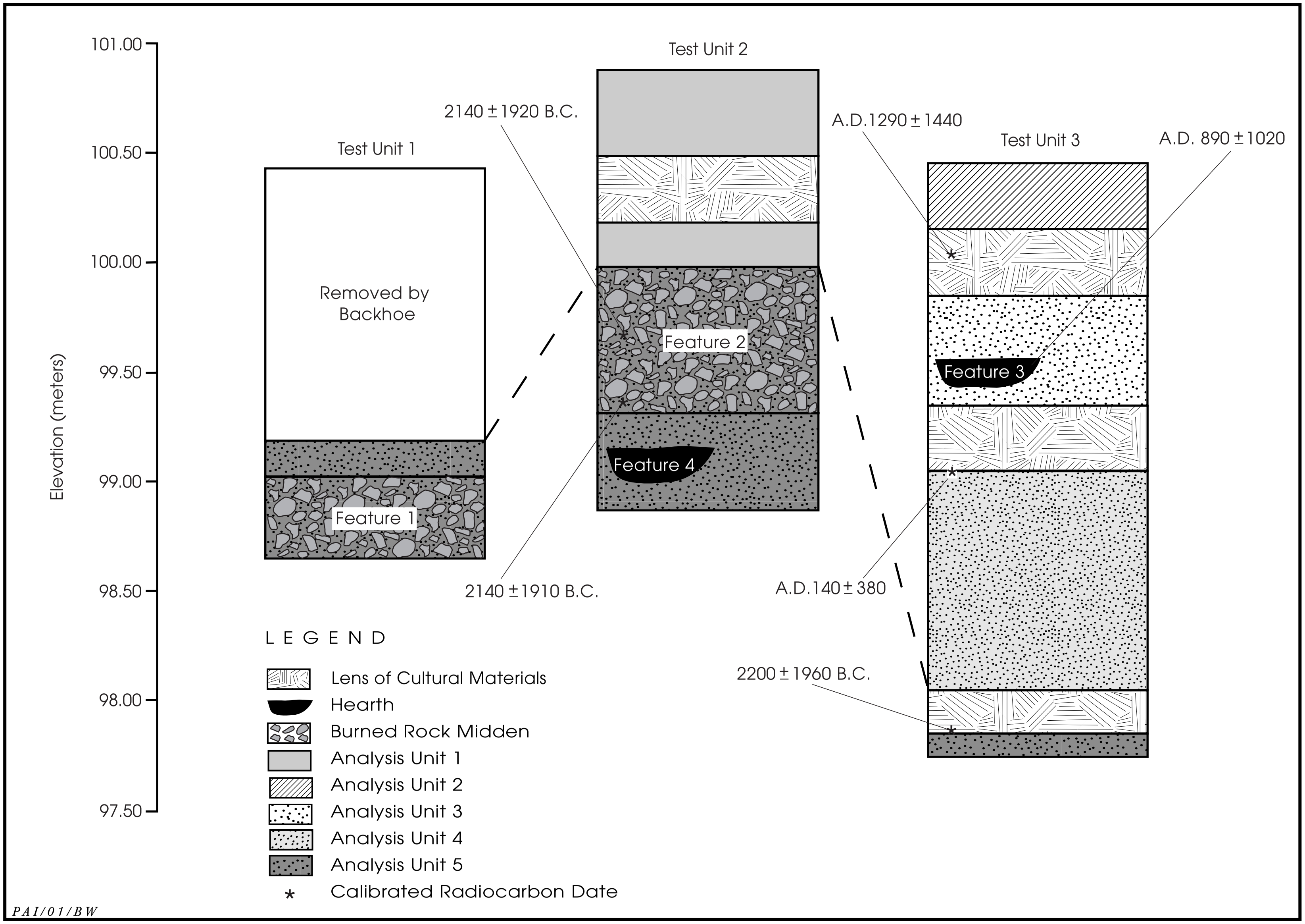

Figure 5.44. Schematic profiles of Test Units 1–3 showing Analysis Units 1–5 and corresponding radiocarbon dates.

Table 5.25. Summary of all cultural materials from 41CV580 by time periods

Time Period (Analytical Group)	Arrow Point Preform	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Miscellaneous Biface	Spokeshave	Graver/Burin	Edge-modified Flakes	Cores	Unmodified Debitage	Hammerstone	Modified Bone Tool	Modified Mussel Shells	Artifact Totals	Unmodified Bones	Unmodified Mussel Shells	Burned Rock Counts	Burned Rock Weights (kg)
Unknown (AU 1)	–	1	1	–	–	–	3	1	44	–	–	1	51	2	25	34	4.00
Late Prehistoric, Toyah Phase (AU 2)	1	–	–	1	1	–	–	–	67	1	1	2	74	9	337	26	2.00
Late Prehistoric, Austin Phase (AU 3)	–	–	–	–	–	–	–	–	16	–	–	–	16	73	68	161	30.25
Late Archaic (AU 4)	–	–	2	–	–	1	1	1	45	–	–	–	50	46	132	170	27.00
Middle Archaic (AU 5)	–	1	–	–	–	–	1	5	120	–	–	–	127	12	106	2,165	685.50
Totals	1	2	3	1	1	1	5	7	292	1	1	3	318	142	668	2,556	748.75

Table 5.26. Summary of unmodified mussel shells by time periods

Taxon	Unknown (AU 1)	Late Prehistoric, Toyah Phase (AU 2)	Late Prehistoric, Austin Phase (AU 3)	Late Archaic (AU 4)	Middle Archaic (AU 5)	Totals
Amblema apiculata	1	4	–	–	–	5
Amblema plicata	12*	179	25	56	18	290
Lampsilis teres	–	5*	1	3	–	9
Leptodea fragilis	1	10	1	3	1	16
Potamilus purpuratis	–	17	2	7	–	26
Quadrula apiculata	–	6	–	3	6	15
Quadrula houstonensis	–	26	3	4	–	33
probable *Quadrula houstonensis*	2	14	–	2	–	18
Quadrula petrina	–	33	15	21	4	73
Quadrula sp.	1	–*	–	–	3	4
Quincuncina mitchelli	2	5	3	4	1	15
Tritogonia verrucosa	3	4	5	11	7	30
Unidentifiable	3	34	13	18	66	134
Totals	25	337	68	132	106	668

* Excludes one modified (cut) specimen.

Table 5.27. Summary of unmodified vertebrate faunal remains by time periods

Taxon	Unknown (AU 1)	Late Prehistoric Toyah Phase (AU 2)	Late Prehistoric Austin Phase (AU 3)	Late Archaic (AU 4)	Middle Archaic (AU 5)	Totals
Vertebrata (unidentifiable)	–	4	43	17	11	75
Emydidae (box and water turtles)	–	1	1	2	–	4
Testudinata (turtle)	–	1	–	4	–	5
Mammalia (micro/small)	–	–	1	–	–	1
Mammalia (mouse/rabbit-sized)	–	–	1	–	–	1
Mammalia (canid/deer-sized)	–	1	16	15	1	33
Artiodactyla (deer-sized)	2	2	6	7	–	17
Odocoileus sp. (deer)	–	–*	–	1	–	1
Sylvilagus sp. (cottontail rabbit)	–	–	5	–	–	5
Totals	2	9	73	46	12	142

* Excludes a deer ulna tool.

Gray-Brown-Green, and Owl Creek Black) make up the largest percentage of the lithic tools and debitage in each component except the Middle Archaic, which yielded a higher frequency of chert types from the Heiner Lake Area (including Heiner Lake Blue, Tan, and Translucent Brown). The undated component also contained some of the Heiner Lake cherts. Examination of the cortex on the Heiner Lake artifacts revealed several specimens with abraded and polished cortex, suggesting they may be cherts from the Leon River bedload or Pleistocene lag gravels and not from the Heiner Lake area. Most of the artifacts consist of indeterminate cherts, with the wide variety of colors and textures typical of the variability seen in fluvial gravel deposits of the Leon River. Occurrence of abraded and polished cortex also suggests raw material acquisition from nearby bedload and lag-gravel sources. In a previous study, chert samples from the House Creek area demonstrated that some Southeast Range chert types (specifically Heiner Lake Blue, Heiner Lake Blue-Light, and Heiner Lake Tan) are found in stream bedload and lag gravels in west Fort Hood and possibly beyond (Boyd 1999:376–377).

In conclusion, this intensively occupied multicomponent site contains stratigraphically discrete features and cultural materials that represent a suite of activities throughout the late Holocene. Occupations are buried in deposits up to 270 cm thick and include the Leon River paleosol, a culturally significant stratigraphic marker found in many localities in this drainage basin. The site also has the potential to yield earlier components in primary context at greater depths. Based on the testing results, 41CV580 is recommended as eligible for listing in the National Register.

41CV669-B

Site Setting

Encompassing an upland surface and adjacent terraces, 41CV669 is situated north of the confluence of two unnamed tributaries of Owl Creek (Figure 5.45). A few ephemeral two-track roads cross the area. The upland supports grasses and an oak-juniper woodland, and vegetation along the drainages is dense and consists of a mixed riparian forest. Site elevation is 240 m above mean sea level.

Previous Work

Holan (Texas A&M University) first recorded the site on 24 February 1983 (Roemer et al. 1989:Appendix 1, 72). The site measured 280 m north-south by 200 m east-west, but the northern boundary was not established because the site extended into an adjacent quadrant that was not surveyed. The area probably represented a habitation site; bifaces, scrapers, flakes, and edge-modified flakes were observed. Two Wells, one Marcos, and an untyped dart point were collected. Roads, erosion, and vehicles disturbed an estimated 12 percent of the site.

Pry and Dureka (Texas A&M University) monitored the site on 7 December 1987. The site area recorded in 1983 was assessed, along with previously unsurveyed areas. It was determined that a nearby site (FN765) should be combined with 41CV669 because no break in cultural materials occurred between the two sites; thus, overall site size was increased to 950x625 m. Many cores, bifaces, and flakes were noted, and one dart point was collected. The site was later classified as a Lithic Resource Procurement Area for management purposes.

On 7 October 1992, Abbott and Turpin (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A988–A992). Because archeological potentials and geomorphic contexts differed, the site was divided into Subareas A and B. Maximum site dimensions were reduced to 520x480 m based on the extent of cultural materials.

Subarea A encompassed a gently sloping intermediate (Killeen) upland surface situated on the interfluve between two incised, south-flowing tributaries. The surface was mantled with a relatively thick in situ soil containing prodigious amounts of residual chert. The soil was up to 40 cm thick and consisted of a granular dark reddish brown stony clay loam A horizon underlain by a fine blocky-structured reddish brown stony clay loam Bt horizon. The substrate consisted of nodular, saprolitic limestone of the Walnut Formation. A moderately dense lag of nodular chert littered the surface, suggesting that incremental, low-magnitude deflation of the area by sheetwash occurred throughout the Holocene. A broad scatter of lithic tools, debitage, sparse burned rocks, and quartzite cobbles were observed. Because potential for intact subsurface

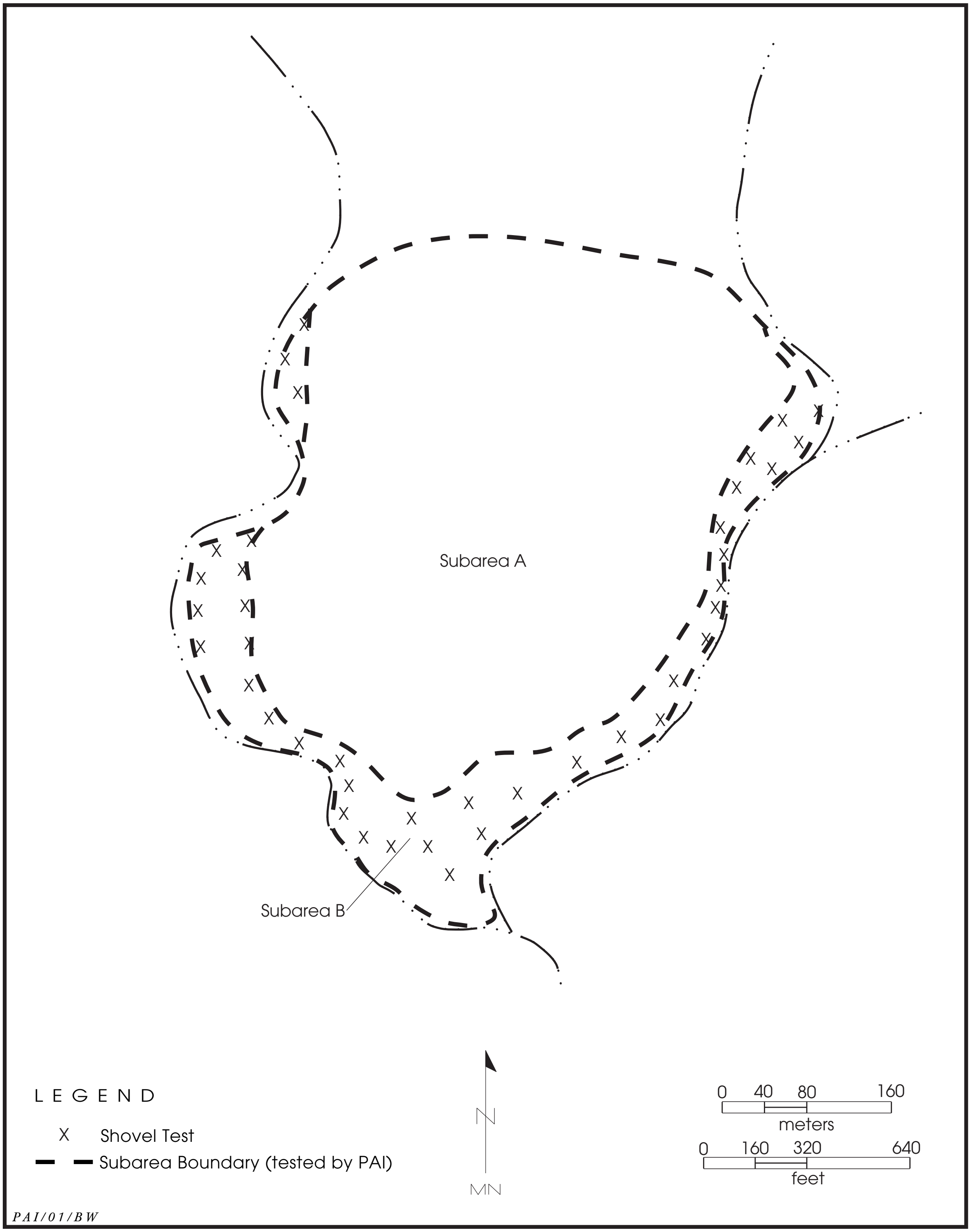

Figure 5.45. Site map of 41CV669 (modified from Trierweiler, ed. 1994:A989).

archeological deposits was limited, shovel testing was not warranted in Subarea A.

Subarea B subsumed Holocene-aged terraces associated with both tributaries. The undulating lower terrace (T_0) rose 1.0–1.5 m above the modern channel, and the upper terrace (T_1) was level to gently sloping and lay 2–4 m above the streambed. Cutbank exposures revealed that the lower fill was predominantly gravelly, and approximately 2 m of distinctly stratified alluvium underlay the upper terrace. These deposits typically consisted of a thick gravelly bed overlain by four or five relatively thin stacked upward-fining layers of limestone and chert gravels that graded abruptly into grayish brown stony clay loams. The individual alluvial layers were frequently capped by dark organic-rich clay loams representing poorly developed cumulic paleosols, indicating that multiple short-term, stable surfaces were intercalated in the terrace. Although these alluvial layers were usually stacked vertically, lateral truncated surfaces and shallow insets were not uncommon, suggesting that the deposits accumulated episodically through a combination of aggradational and erosional episodes. It was difficult to correlate the deposits with Nordt's (1992) stratigraphic framework, but the lack of diagenetic alteration and rubification and the presence of very weak soil development suggested that the upper terrace deposits were probably equivalent to the West Range alluvium. The lower terrace sediments represented recent stream activity and probably corresponded to the Ford alluvium. Sparse lithic artifacts were exposed across the subarea, and vegetation and grass cover limited surface visibility. Because Subarea B had the potential for buried cultural deposits, shovel testing was warranted.

On 27 October 1992 and 20 May 1993, crews excavated a total of 40 shovel tests to a maximum depth of 40 cm on Subarea B (Trierweiler, ed. 1994:A988–A992). Nine positive tests yielded 14 flakes and 1 core between 0 and 30 cm. The results suggested that the upper 40 cm of deposit had limited potential to contain intact archeological remains but that intact cultural deposits were possible beneath the limits of shovel testing.

On 17 May 1993, Abbott and Kleinbach (Mariah Associates) evaluated the potential utility of Subarea A to address questions of lithic resource procurement and reduction (Trierweiler, ed. 1994:A988–A992). Chert and impact zones were identified, mapped, and described, and chert samples were collected. Subarea A contained chert resources and was not completely disturbed, so a crew returned on 27 May 1993 to conduct a Lithic Resource Procurement Area survey and assessment. The survey indicated that the artifact assemblage was too thinly distributed to provide useful data for lithic procurement issues. Subarea A, therefore, was recommended as not eligible for National Register listing and required no further management. Subarea B, however, was recommended as potentially eligible because it is possible intact, subsurface cultural deposits are present. For Subarea B, recommended testing to determine National Register eligibility consisted of a minimum of two backhoe trenches and 1–2 m^2 of manually excavated test units (Trierweiler, ed. 1994: A992).

Work Performed

On 6 June 2000, formal testing of Subarea B at 41CV669 was completed (Figure 5.46). After consulting with Eckrich (The Nature Conservancy) about the site location, backhoe trenching was limited to existing cleared areas because the site was situated within an endangered species protected habitat. No cultural materials were observed in the tributary cutbank. The excavations consisted of four backhoe trenches (Backhoe Trenches 1–4) and two 1.00x0.50-m test units (Test Units 1–2); a total of 1.25 m^3 was manually excavated.

Backhoe Trench 1 was situated near the cutbank edge along the western margin of 41CV669-B and had maximum dimensions of 10.0x0.7x2.8 m. Backhoe Trenches 2 and 3 were placed near the south-central margin of the subarea where the terrace is widest. Both trenches were aligned along a north-south axis, and measured 7.5–9.5 m long, 0.7 m wide, and 1.8–2.5 m deep. Backhoe Trench 4 was excavated about 115 m northeast of Backhoe Trench 3 and measured 5.5x0.7x1.6 m. None of the trenches encountered cultural materials.

Test Units 1 and 2 were placed along the west walls of Backhoe Trenches 4 and 2, respectively. Both units were terminated at dense gravels.

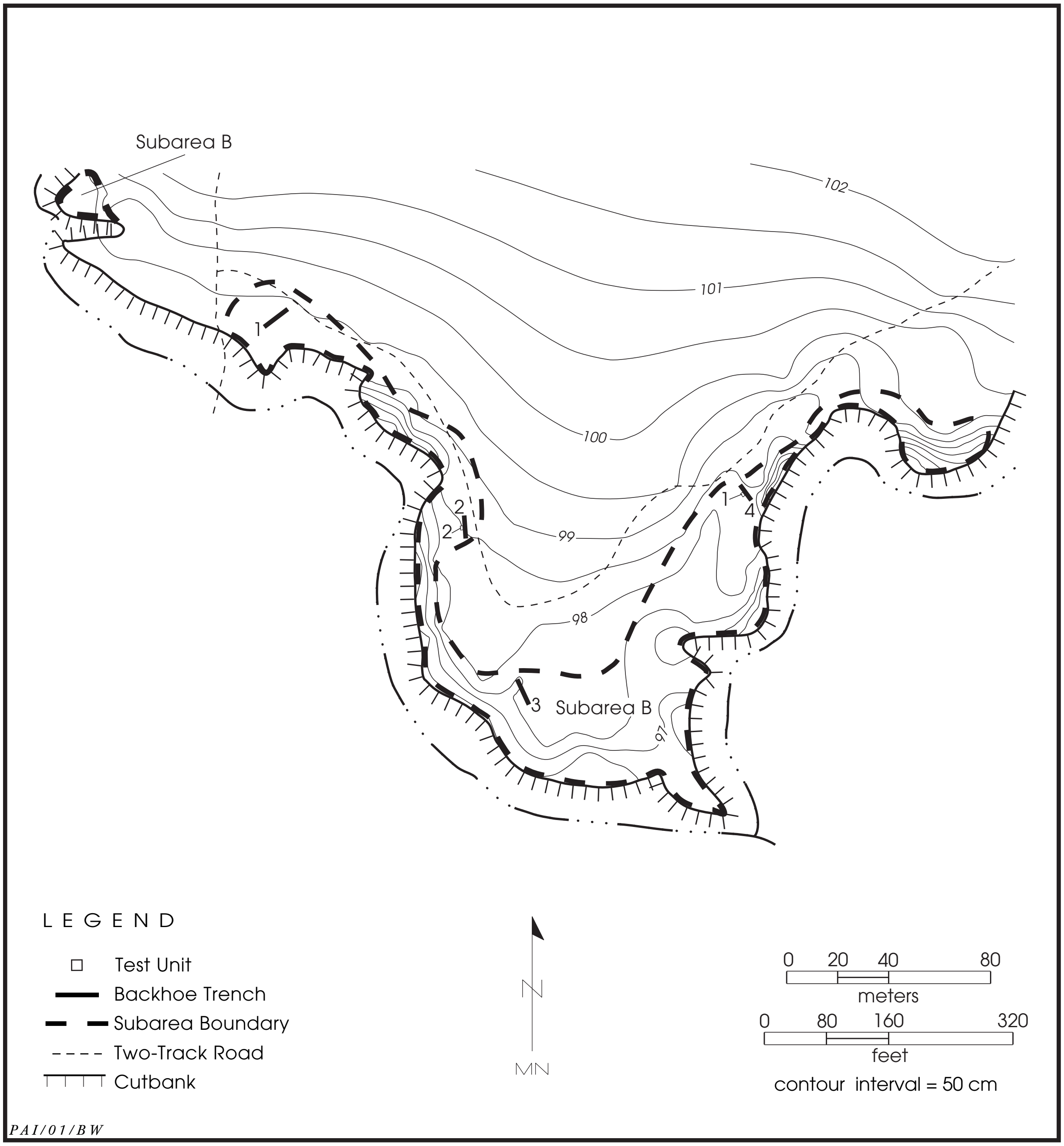

Figure 5.46. Site map of 41CV669-B.

Site Extent and Depth

This irregular, U-shaped subarea includes a larger, continuous section of terrace that measures approximately 400 m long and 10–80 m wide. One small terrace segment at the northwest site margin is 20 m in diameter. No stratigraphically discrete cultural components are present based on the paucity of cultural materials.

Sediments and Stratigraphy

Deposits in the T_1 were examined through four backhoe trenches, with the soil stratigraphy of two trenches described in detail. The profiles consist of loamy and gravelly alluvial deposits of late Holocene age, probably equivalent to Nordt's (1992) West Range alluvium. Backhoe Trench 2 consists of dark loamy deposits over basal gravel beds. These deposits are imprinted with an A-Bw-C soil profile. The A horizon (0–35 cm) is a very dark grayish brown silty clay loam. The Bw horizon (35–107 cm) is a gravelly dark grayish brown clay loam. The C horizon (107–178+ cm) is a sequence of three upward-fining gravel beds. The upper bed (107–126 cm) consists of clast-supported rounded limestone and chert gravels with no interstitial mud. The two underlying beds (126–146 cm and 146–178+ cm) comprised clast-supported rounded limestone and chert gravels with interstitial mud and sand.

The soil stratigraphy of Backhoe Trench 4 is similar in that it consists of dark loamy deposits over bedded gravels. These alluvial deposits exhibit an A-Bw-Bw2 soil profile. The A horizon (0–35 cm) is a very dark gray clay loam with subangular to subrounded matrix-supported (10 percent) limestone and chert gravels. The Bw horizon (35–65 cm) is a gravelly dark grayish brown clay loam with subangular to subrounded matrix-supported limestone and chert gravels. The Bw2 horizon (65–158+ cm) is a gravelly grayish brown clay loam. Limestone and chert gravels are present in the form of multiple stringers at 65–98 cm below the surface. Matrix-supported gravels (15 percent) are common at 98–158+ cm below the surface.

Cultural Materials

Seventeen of 25 levels (68 percent) excavated from Test Units 1 and 2 produced cores, a tested cobble, flakes, and a small burned rock (Table 5.28). No level yielded more than 6 items.

Discussion

The paucity of cultural materials from the excavations suggests that there are no isolable cultural deposits present. Moreover, basal gravel deposits and gravel stingers represent channel fills and gravel-filled point bar chutes, and the contextual integrity of artifacts contained in these deposits is doubtful. Based on the testing results, 41CV669-B is recommended as not eligible for listing in the National Register.

41CV686-A

Site Setting

Site 41CV686 is located on an upland surface north of the confluence of two unnamed tributaries of Owl Creek (Figure 5.47). Two-track roads cross the area, and one burned rock mound is situated at a road intersection near the northwest site margin. Vegetation consists of dense juniper-oak woodland. Site elevation is 240 m above mean sea level.

Previous Work

Meiszner, Holan, Day, and Fabac (Texas A&M University) recorded the site on 5 May 1983 (Roemer et al. 1989:Appendix I, 24). The 90x50-m lithic scatter consisted of bifaces, scrapers, cores, hammerstones, debitage, and sparse burned rocks. This site was located on the same landform as 41CV669 (situated across the creek to the east), and the two sites may be associated. A road and earth moving disturbed an estimated 15 percent of the site.

On 8 October 1992, Abbott and Turpin (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A995–A997). The site dimensions were modified to 75x65 m based on the surface scatter of cultural materials. A previously unrecorded burned rock mound (Feature 1) was discovered near the northwest site margin.

A scatter of cultural materials—burned rocks, stone tools, and flakes—was noted across a gently sloping projection of the intermediate upland (Killeen) surface situated on the interfluve above two incised, south-flowing tributaries. The west tributary was much less active than the eastern drainage. The upland surface was mantled with a relatively thick, ancient, residual limestone soil containing prodigious amounts of chert. The soil was up to 40 cm thick and consisted of a granular, dark reddish brown stony clay loam A horizon underlain by a fine blocky reddish brown stony clay loam Bt horizon. The substrate was a nodular, saprolitic limestone of the Walnut Formation. A moderately dense lag of nodular chert littered the surface, suggesting that

Table 5.28. Cultural materials from 41CV669-B, Test Units 1 and 2

Provenience	Cores	Tested Cobble	Unmodified Debitage	Artifact Totals	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1						
Level 1 (0–10 cm)	–	–	1	1	–	–
Level 3 (20–30 cm)	–	–	3	3	–	–
Level 4 (30–40 cm)	–	–	1	1	–	–
Level 6 (50–60 cm)	–	1	5	6	–	–
Level 8 (70–80 cm)	–	–	1	1	–	–
Level 9 (80–90 cm)	–	–	3	3	–	–
Level 10 (90–100 cm)	–	–	1	1	–	–
Level 11 (100–110 cm)	–	–	2	2	–	–
Subtotals	0	1	17	18	0	0.00
TEST UNIT 2						
Level 3 (20–30 cm)	–	–	1	1	–	–
Level 4 (30–40 cm)	–	–	2	2	1	0.10
Level 5 (40–50 cm)	–	–	2	2	–	–
Level 6 (50–60 cm)	–	–	2	2	–	–
Level 7 (60–70 cm)	–	–	2	2	–	–
Level 8 (70–80 cm)	1	–	1	2	–	–
Level 9 (80–90 cm)	–	–	3	3	–	–
Level 10 (90–100 cm)	–	–	2	2	–	–
Level 11 (100–110 cm)	1	–	3	4	–	–
Subtotals	2	0	18	20	1	0.10
Totals	2	1	35	38	1	0.10

incremental, low-magnitude deflation of the area by sheetwash occurred throughout the Holocene. Several two-track roads crisscrossed the site, severely churning the surface.

The area was deflated to just above bedrock except on the northwest periphery where Feature 1 was located. The burned rock mound was approximately 6 m in diameter and appeared to be 20 cm high. A road disturbed the west edge of the feature. In general, the upland surface had negligible potential for intact archeological components, and no further work was recommended. Feature 1, however, had the potential to yield intact cultural deposits, and shovel testing was recommended only on the burned rock mound.

On 27 October 1992, a Mariah crew excavated one shovel test on the west edge of Feature 1. Flakes and burned rocks were present to 50 cm, with cultural materials decreasing gradually with depth. At 0–40 cm, the matrix was a gray clay loam; this sediment was mottled with a reddish brown clay loam at 40–50 cm. The shovel test was terminated at 50 cm. The test results indicated that Feature 1 contained cultural deposits of unknown significance. Recommended testing to determine National Register eligibility of the burned rock mound consisted of a minimum of 2 m^2 of manually excavated test units (Trierweiler, ed. 1994:A997).

Work Performed

Because the area encompassing Feature 1 was the only portion of the site recommended for formal testing, it is designated Subarea A. The rest of the Killeen upland, previously determined ineligible, was designated Subarea B. Formal testing of Feature 1 at 41CV686-A was completed on 8 June 2000 (Figure 5.48). At this time, it was clear that vegetation clearing had affected the feature. The mound's surface was fully exposed and exhibited no relief (not even the 20 cm noted in 1992). Vehicle tracks

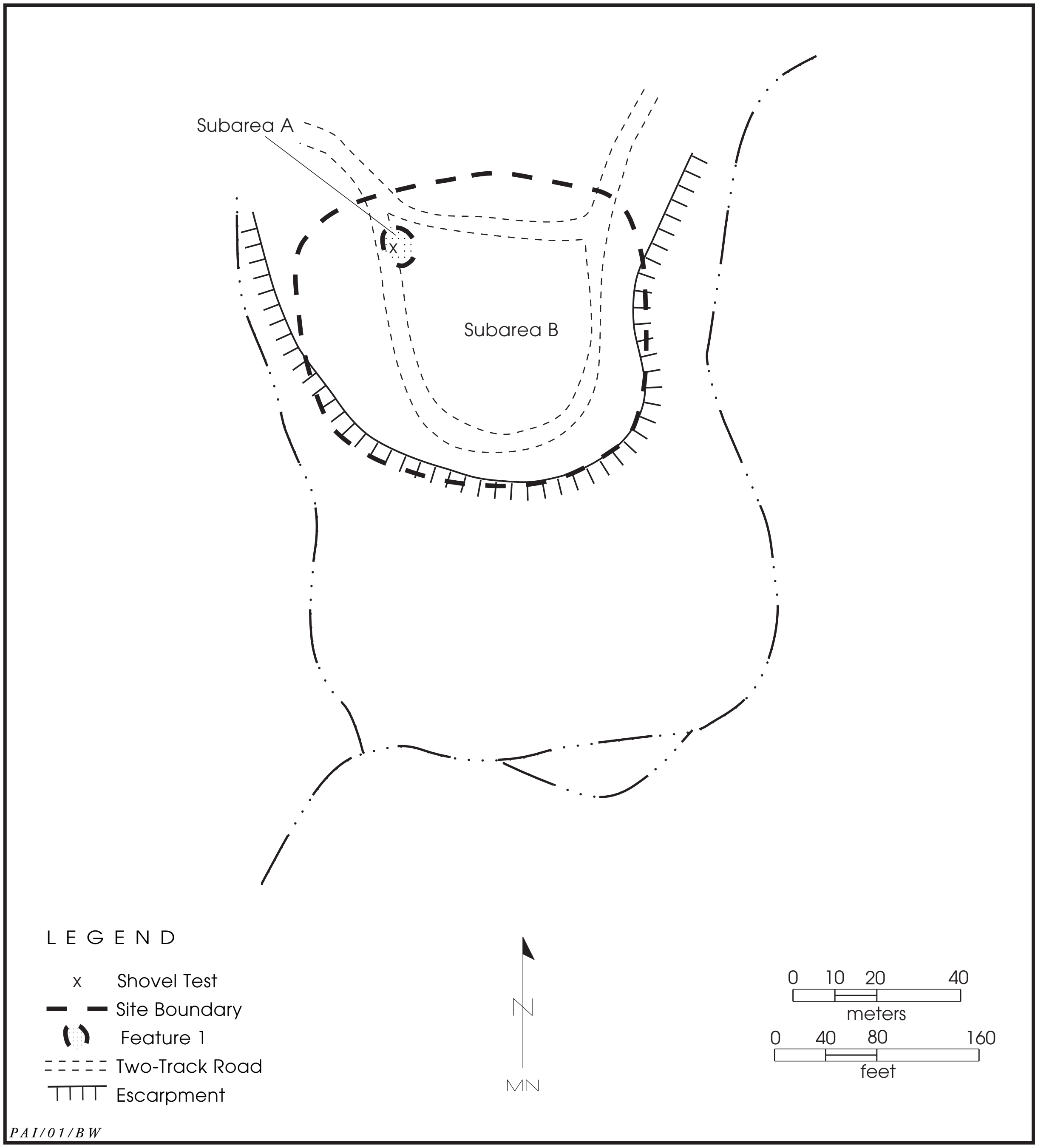

Figure 5.47. Site map of 41CV686 (modified from Trierweiler, ed. 1994:A996).

and ruts were visible across the feature's surface. Nearby trails were widened, and junipers in the vicinity were cleared and pushed into piles or had broken branches. Dense burned rocks and debitage were exposed and scattered in an area approximately 6 m in diameter. Test Unit 1 (1x1 m) was placed near the center of Feature 1; a total of 0.60 m^3 was manually excavated.

Site Extent and Depth

This subarea is restricted to Feature 1, a

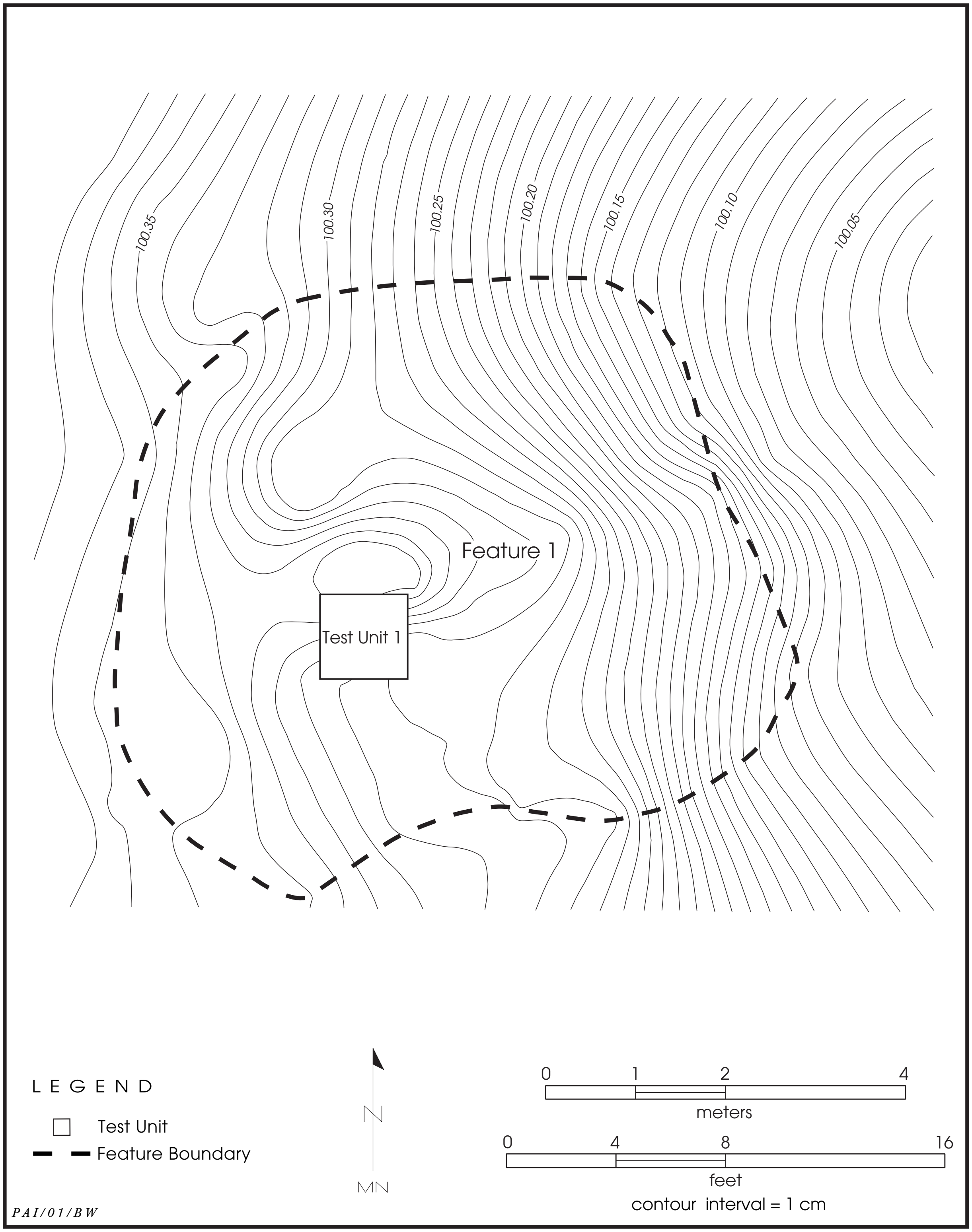

Figure 5.48. Plan of Feature 1, 41CV686-A.

burned rock mound with maximum dimensions of 7.5 m east-west by 6.5 m north-south. The feature fill consists of a 57-cm-thick, anthropogenic black clay loam; the mound rests on a gravelly reddish brown sterile clay loam (Bt horizon).

Cultural Feature

Feature 1, a burned rock mound, was present from the surface to 57 cm in Test Unit 1. Along the north wall of the unit, the base of the mound was encountered at 40 cm, but it sloped gradually to the south to a maximum depth of 57 cm. Reddish brown sediment underlay Feature 1 (Bt horizon); this fill was culturally sterile from 40 to 60 cm.

The feature matrix excavated from Test Unit 1 produced 2,689 burned rocks (227.5 kg), 6 stone tools, 246 flakes, and 10 unmodified bones (Table 5.29). Modern plastic was present at 0–10 cm, indicating that the upper 10 cm was disturbed, and roots were observed throughout the feature. The densest layer of burned rocks (n = 801, 73 kg) occurred at 20–30 cm; there were some larger burned rocks (10–12 cm in size) in the northern third of the unit, but no patterning was apparent and no evidence of an intact internal feature was found. Overall, the number of larger angular and tabular rocks 5–15 cm in size increased with depth, but the vast majority throughout the mound were angular pieces measuring less than 5 cm. Almost half of the flakes (n = 117) and 7 of the 10 bones were recovered at 30–40 cm.

Three flotation samples collected between 30 and 57 cm yielded a variety of macrobotanical remains. Wood of Salicaceae and *Carya*, *Celtis*, *Diosypros*, *Platanus*, *Quercus*, and *Ulmus* spp.—as well as *Carya illinoensis* nut shells, *Quercus* sp. acorns, and *Diosypros* sp. seeds—were identified. Charcoal collected at 44 cm yielded a conventional radiocarbon age of 710 ± 40 B.P. (Beta-155427).

Discussion

Originally recorded in 1992, Feature 1 is a burned rock mound severely damaged by vegetation clearing. Modern material from the excavation unit, tire ruts, and the absence of relief suggests that the upper 10–15 cm of fill is probably disturbed and compressed. Below this level, the mound is approximately 30–40 cm thick and rests on an undulating gravelly residual upland soil. The feature accreted at least during the Late Prehistoric period, Toyah phase, based on a calibrated radiocarbon date (2-sigma range) of A.D. 1260–1380. Although placed near the center of the mound, the excavation failed to locate any internal feature, such as a central hearth or earth oven. Feature 1 did, however, yield a variety of well preserved macrobotanical remains. Byproducts of cooking such as willow family, hickory, hackberry,

Table 5.29. Cultural materials from 41CV686-A, Test Unit 1

Provenience	Dart Point	Early- to Middle-stage Biface	Late-stage to Finished Bifaces	Miscellaneous Biface	Unmodified Debitage	Artifact Totals	Unmodified Bones	Burned Rock Counts	Burned Rock Weights (kg)
Feature 1 (0–10 cm)	–	–	1	1	26	28	–	445	28.50
Feature 1 (10–20 cm)	1	–	1	–	24	26	–	575	29.50
Feature 1 (20–30 cm)	–	1	–	–	23	24	–	801	73.00
Feature 1 (30–40 cm)	–	–	–	–	117	117	7	435	50.00
Feature 1 (40–50 cm)	–	–	1*	–	34	35	1	350	36.00
Feature 1 (50–57 cm)	–	–	–	–	22	22	2	83	10.50
Levels 5–6 (40–60 cm)	–	–	–	–	–	0	–	–	–
Totals	1	1	3	1	246	252	10	2,689	227.50

* A broken Friday biface.

persimmon, sycamore, oak, and elm wood likely represent fuel. The presence of pecan nut fragments, oak acorns, and persimmon seeds are evidence of food resources. Dering notes that the "unusually high density of acorn fragments at 41CV686-A may be a clear indication of acorn processing" (see Appendix E). He also states that parching acorns on heated rocks could result in accidental charring, but archeological evidence of features associated with this process is still lacking. Ethnographically, parching usually involves the use of woven trays typically made of willow withes or plant fibers on open cooking features. Although inconclusive, the presence of charred willow family wood indicates that this resource was available in the area.

Although limited in number, the occurrence of faunal remains is unusual given that they are rarely recovered from burned rock mound contexts. At 41CV686-A, four bones are from canid- to deer-sized mammals, and one of these is spirally fractured. The rest of the assemblage consists of unidentifiable fragments.

Feature 1 contained 252 lithic artifacts consisting of an untypeable dart point, 5 bifaces, and 246 flakes. All of the bifaces are fragmentary except for one nearly complete specimen. Three of the specimens are late-stage bifaces, including one Friday biface, apparently broken in manufacture. More than half of the debitage consists of cortical flaking debris (n = 144, 58.5 percent). Although the debitage less than 1/4 inch in size is the most common (n = 138, 56.1 percent), a significant number of flakes are larger than 1.5 inches (n = 17, 6.9 percent). A qualitative examination of debitage-striking platforms reveals that most flakes larger than 1.5 inches exhibit large single-facet platforms, suggesting flake extraction from a core. In the smaller size grades (less than 1 inch), several single-facet platforms, as well as a few lipped and faceted platforms, were observed. These observations suggest a diversity of lithic reduction activities were taking place at the site, including core, early-stage biface, flake blank production, and middle- to late-stage biface production.

As far as raw material acquisition is concerned, notable homogeneity of chert types was seen in the assemblage. Nearby chert resources from the North Fort Province are the most commonly identified types and are dominated by Gray-Brown-Green (n = 66, 64.1 percent) and Fort Hood Yellow (n = 32, 31.1 percent), along with Fort Hood Gray (n=2) and Owl Creek Black (n=2). Only one Southeast Range chert type (Heiner Lake Tan, n=1) is represented. The cherts from indeterminate sources (n = 149, 59.1 percent) probably represent use of nearby bedrock sources or bedload cherts from Owl Creek. A qualitative examination of cortex reveals a dominance of rough limestone cortex with little or no abrasion, suggesting raw material acquisition from primary bedrock sources or secondary sources that have not transported materials far enough to create abraded or polished cortex (i.e., colluvial or bedload near the source outcrop). Based on the testing results, 41CV686-A (Feature 1) is recommended as eligible for listing in the National Register.

41CV730-B

Site Setting

Situated north of Cold Springs Road and west of an unnamed tributary of Owl Creek, 41CV730 encompasses an upland slope, colluvial toeslope, and Holocene-aged terrace (Figure 5.49). The terrace has been cleared of vegetation and supports grasses and isolated juniper trees, and a dense oak-juniper woodland covers the rest of the area. Site elevation is 250 m above mean sea level.

Previous Work

Moore and Ensor (Texas A&M University) recorded the site on 24 January 1984 (Carlson et al. 1986:144–145). A lithic scatter consisting of flakes, scrapers, bifaces, cores, and burned rocks extended 220x200 m. One dart point and a triangular biface were collected. Trails and erosion affected an estimated 35 percent of the site.

On 13 November 1992, Abbott and Turpin (Mariah Associates) visited and evaluated the site (Trierweiler, ed. 1994:A1006–A1008). Based on differing archeological potentials and geomorphic contexts, the site was divided into Subareas A and B. Based on the extent of cultural materials, the site size was reduced to 175x125 m.

Comprising two-thirds of the site area, Subarea A consisted of the intermediate upland

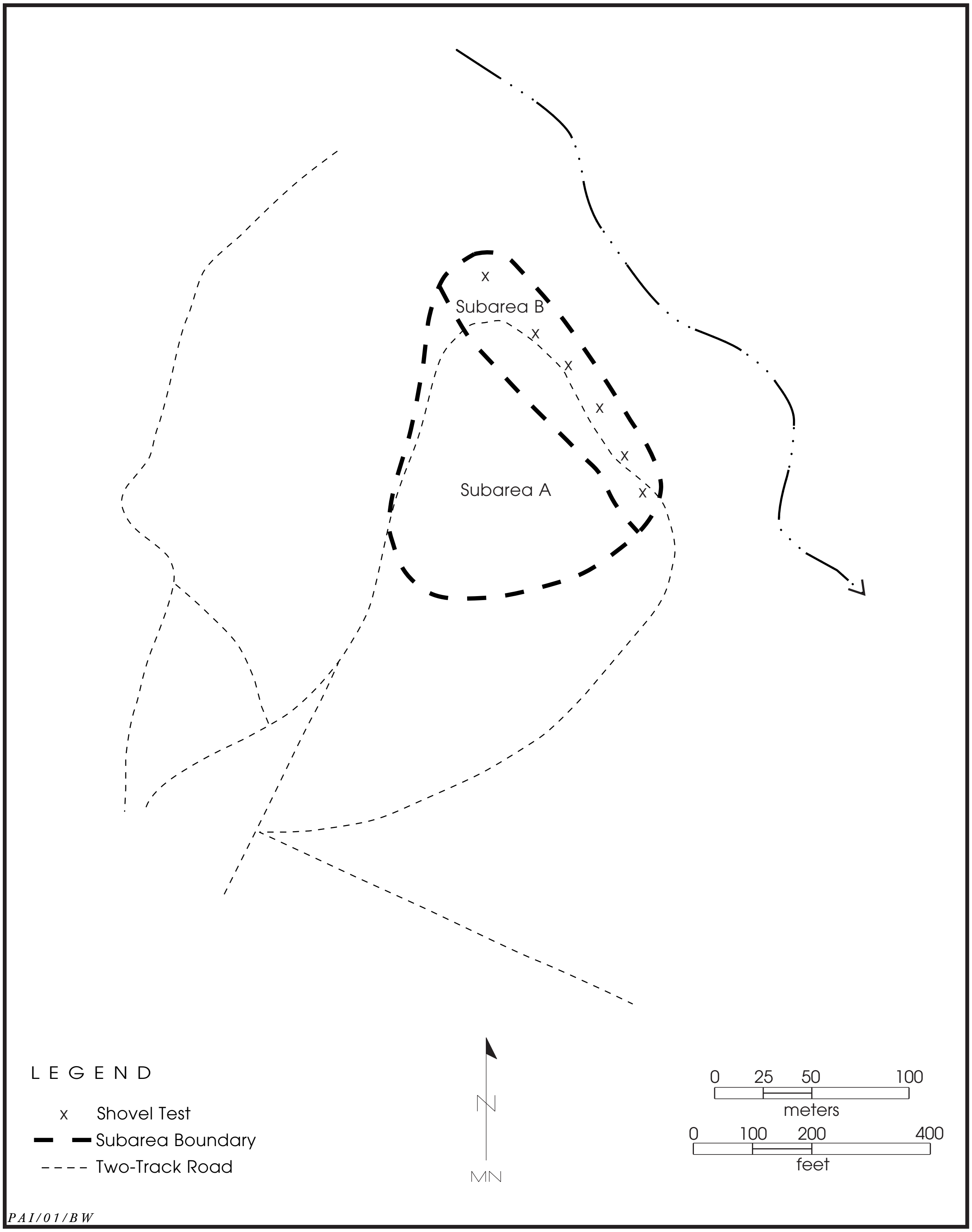

Figure 5.49. Site map of 41CV730 (modified from Trierweiler, ed. 1994:A1007).

(Killeen) slope. The subarea was mantled with a thin discontinuous light brown stony clay loam A horizon primarily formed in trapped slopewash deposits rarely exceeding 5 cm thick. Abundant limestone and chert cobbles littered this surface. Sheet erosion, vehicles, and bioturbation severely disturbed the subarea. Because potential for intact archeological deposits is limited, no further work was recommended for Subarea A.

Subarea B subsumed the colluvial toeslope and distal portion of the terrace (T_1). Profiles of the toeslope were visible along several rutted roads, but exposure of the terrace was extremely limited. The toeslope consisted of a wedge of very stony clay loam exhibiting an A-C to A-Bw-C profile. It appeared to thicken downslope and interfinger with distal terrace deposits on the margin of the valley. The surficial horizon on the terrace was a very dark grayish brown stony clay loam A horizon. The underlying horizons were poorly exposed, but the deposits were thought to be up to 1 m thick. Bioturbation, vehicles, and sheet erosion moderately disturbed the area. Sparse debitage was scattered across the subarea. Because Subarea B had the potential to contain buried cultural deposits, shovel testing was warranted.

On 4 March 1993, a crew excavated six shovel tests to 40 cm on Subarea B. One test contained four flakes and recently burned wood at 0–10 cm. Results indicated that the upper 40 cm of deposit had limited archeological potential, but intact cultural deposits were potentially present below the level of testing. Recommended testing to determine National Register eligibility consisted of a minimum of one backhoe trench and 2–4 m^2 of manually excavated test units (Trierweiler, ed. 1994:AA1008).

Work Performed

On 12 June 2000, formal testing of Subarea B at 41CV730 was completed (Figure 5.50). No cultural materials were observed in the tributary cutbank just beyond the eastern site margin. The excavations consisted of two backhoe trenches (Backhoe Trenches 1–2) and two 1.00x0.50-m test units (Test Units 1–2); a total of 1.8 m^3 was manually excavated.

Near the north end of 41CV730-B, Backhoe Trench 1 crossed the colluvial toeslope and a large portion of the Holocene terrace. The trench had maximum dimensions of 59.0x0.7x3.1 m. A burned rock was observed at ca. 80 cm near the toeslope-terrace interface. About 60 m southeast of Backhoe Trench 1, Backhoe Trench 2 was excavated on the terrace and measured 9.0x0.7x2.6 m. No cultural materials were found.

Test Units 1 and 2 were placed along the east and south walls of Backhoe Trenches 1 and 2, respectively. Both excavations were arbitrarily terminated at 180 cm.

Site Extent and Depth

Site 41CV730-B is delineated by the tributary and base of the upland slope to the east and west, respectively. Although the toeslope and terrace continue an unknown distance to the north and south, past and present investigations indicate that the site measures 120 m north-south by 105 m east-west. No isolable cultural deposits could be distinguished because lithic artifacts were scarce.

Sediments and Stratigraphy

The colluvial toeslope is mantled by recent gravelly slopewash, and the underlying deposits consist of gravelly facies that fine downslope to more loamy facies and inconspicuously interfinger with the valley alluvium. These deposits were observed in Backhoe Trench 1, which traversed the toeslope and terrace; the soil stratigraphy of three profiles within Backhoe Trench 1 was described. Crossing the toeslope, the southern end of the trench consists of late Holocene colluvial and slopewash deposits. These deposits are imprinted with a C-Ab-Bwb-Bwb2 soil profile. The C horizon (0–33 cm) is a recent deposit of very gravelly brown silt loam. The Ab horizon (33–67 cm) is a gravelly very dark grayish brown silty clay loam. The Bwb horizon (67–103 cm) is a gravelly brown silty clay loam. The Bwb2 horizon (103–200+ cm) is a mottled brown silty clay loam with matrix-supported (10 percent) limestone gravels.

In the middle of Backhoe Trench 1 the deposits consist of late Holocene alluvium, probably equivalent to Nordt's (1992) West Range alluvium. The 171-cm-thick profile is imprinted with a cumulic soil exhibiting an

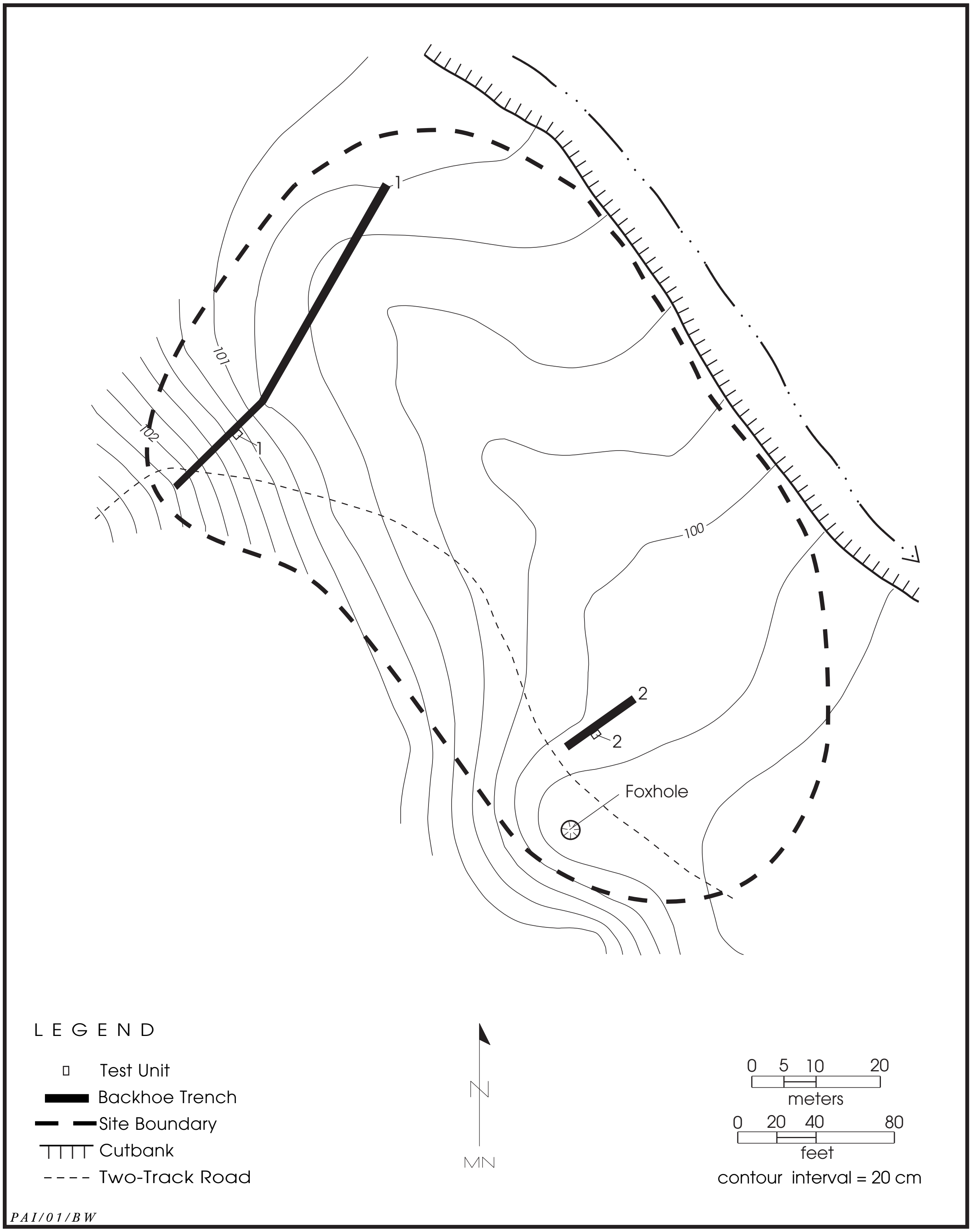

Figure 5.50. Site map of 41CV730-B.

A-AB-B-C profile. The A horizon (0–69 cm) is a very dark gray silty clay loam. The AB horizon (69–105 cm) is a dark gray clay loam and the B horizon (105–141 cm) is a gravelly mottled brown and dark gray clay loam. A bed of poorly sorted, clast-supported gravels (141–171+ cm) designated as a C horizon underlies the soil.

The 295-cm-thick profile at the northern end of the trench also consists of late Holocene alluvial deposits. These deposits also display a cumulic soil exhibiting an A-AB-B-BC profile. The A horizon (0–93 cm) is a dark gray silty clay loam. The AB horizon (93–178 cm) is a gravelly dark gray clay with limestone and chert gravels in the form of distinct stringers. The B horizon (178–238 cm) is a very gravelly mottled brown and gray clay loam. The BC horizon (238–295+ cm) is a mottled brownish yellow and light gray sandy clay loam.

Late Holocene alluvial deposits were observed in the profile of Backhoe Trench 2; these deposits are imprinted with an A-B-Bt-BC soil profile. The A horizon (0–66 cm) is a dark gray silty clay loam. The B horizon (66–117 cm) is a grayish brown silty clay loam, and the Bt horizon (117–188 cm) is a gravelly very dark gray to dark gray clay loam. The BC horizon (188–213+ cm) is a very gravelly mottled yellowish brown and gray sandy loam.

Cultural Materials

The upper 24 cm of deposit in Test Unit 1 consisted of recent slopewash; this sediment was removed and not screened. The excavation extended from 24 to 180 cm, but three levels produced a total of only four flakes (Table 5.30). In Test Unit 2, 8 of the 18 levels excavated from the surface to 180 cm yielded debitage. No one level contained more than three flakes.

Discussion

Sparse amounts of debitage from the excavations suggest that no intact archeological remains are present in the toeslope or terrace deposits. Also, debitage recovered from the lower levels is intermixed with gravelly deposits representing channel fills or point bar chutes, suggesting that these artifacts are in secondary context. Based on the testing results, 41CV730-B is recommended as not eligible for listing in the National Register.

41CV1434

Site Setting

Site 41CV1434 is situated on a terrace southeast of the confluence of two unnamed tributaries of Table Rock Creek (Figure 5.51). A two-track road parallels and crosses the drainage along the western site boundary. Dense vegetation consists of an oak-juniper woodland. Site elevation is 270–280 m above mean sea level.

Previous Work

On 1 May 1987, Dureka and Rotunno (Texas A&M University) recorded the site as an open camp extending 190x75 m (Mueller-Wille and Carlson 1990b:163–164). Despite the dense vegetation cover, burned rocks, debitage, edge-modified flakes, and cores were noted, and one Ensor dart point was collected. The depth of the deposits was listed as greater than 60 cm thick, and the potential for intact subsurface deposits was considered high. Only limited damage from military maneuvers was noted, and trails and erosion affected an estimated 30 percent of the site.

Table 5.30. Cultural materials from 41CV730-B, Test Units 1 and 2*

Provenience	Unmodified Debitage
TEST UNIT 1	
Level 3 (24–30 cm)	1
Level 4 (30–40 cm)	2
Level 7 (60–70 cm)	1
Subtotals	4
TEST UNIT 2	
Level 1 (0–10 cm)	1
Level 9 (80–90 cm)	1
Level 11 (100–110 cm)	2
Level 12 (110–120 cm)	3
Level 13 (120–130 cm)	3
Level 15 (140–150 cm)	3
Level 16 (150–160 cm)	1
Level 17 (160–170 cm)	1
Subtotals	15
Totals	19

* Each unit measures 1.0x0.5 m.

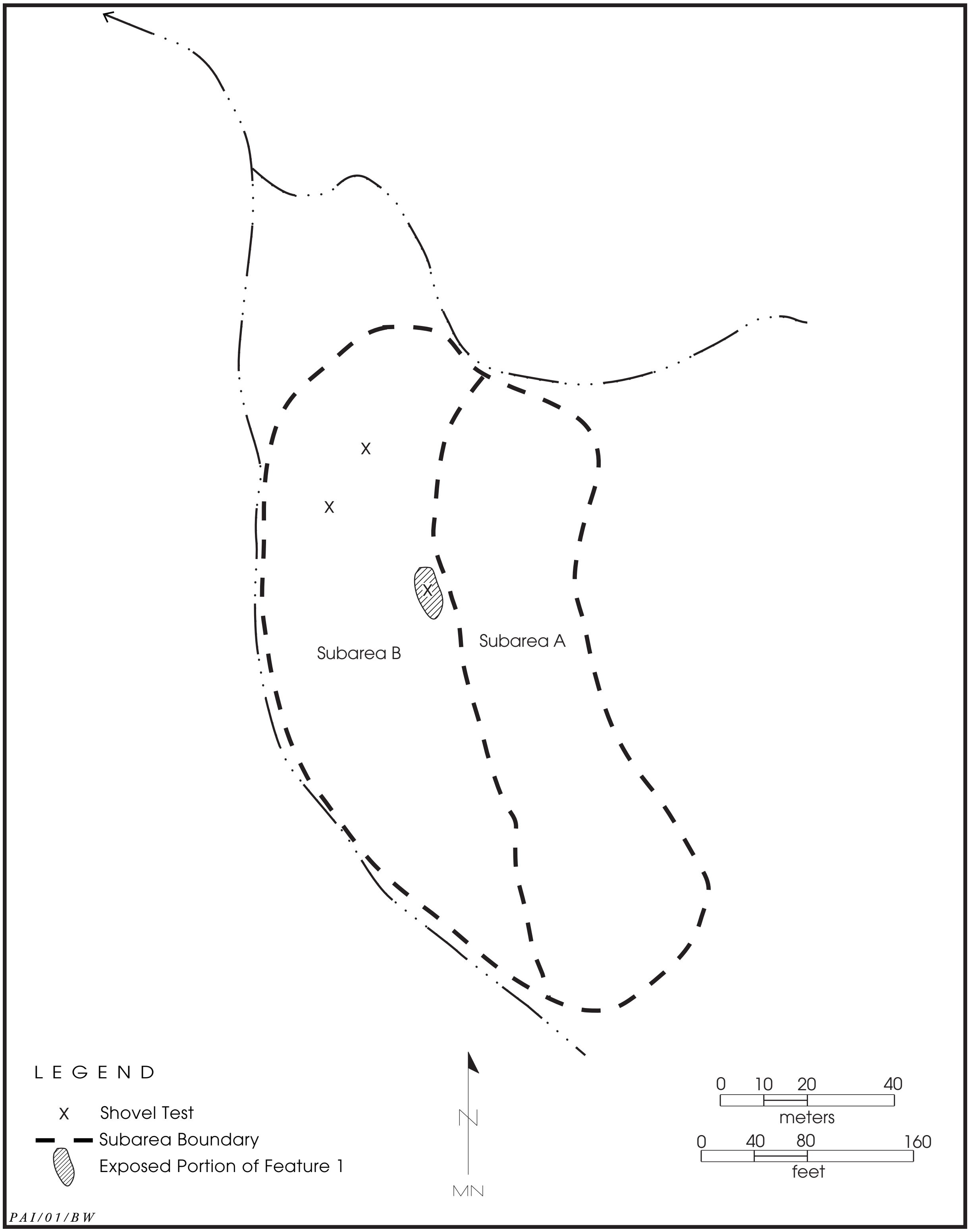

Figure 5.51. Site map of 41CV1434 (modified from Kleinbach 2000:268).

On 5 September 1997, Bernhardt and Schuy (Baylor University) and Kleinbach (Prewitt and Associates) visited and evaluated the site (Kleinbach 2000:267–269). Based on differing archeological potentials and geomorphic contexts, the site was divided into Subareas A and B. The site dimensions established in 1987 were unchanged.

Subarea A consisted of the slope that supported a dense oak-juniper woodland. One 30-cm-deep shovel probe revealed an A-Bk-Cr profile. The A horizon consisted of a dark gray clay loam with carbonate filaments that graded into a grayish brown clay loam (Bk horizon) underlain by bedrock. Sparse debitage and burned rocks were observed, and the entire slope exhibited severe sheet erosion. Because potential for intact archeological deposits is limited, no further work was recommended for Subarea A.

Subarea B subsumed the alluvial floodplain adjoining the shallow unnamed tributaries, which was prone to occasional flooding. A 100-cm-thick cutbank exposure and one 30-cm-deep shovel probe revealed that a grayish brown clay loam underlain by sandy deposits and channel gravels characterized Subarea B. The thickness of the cutbank suggested that alluviation was recent. Burned rocks and debitage were scattered across the subarea, and a burned rock concentration designated as Feature 1 was exposed in and along an old trail that transected the terrace. The visible portion of Feature 1 was 4–5 m in diameter, and debitage was found in association. One Castroville dart point was collected from the trail. Erosion and bioturbation minimally disturbed the subarea. Because Subarea B had the potential for buried cultural deposits, shovel testing was warranted.

On 12 September 1997, a Prewitt and Associates crew excavated three shovel tests in Subarea B. Excavated to 80 cm, Shovel Test 1 was placed near Feature 1. The feature, encountered from 0 to 40 cm, produced 32 burned rocks and 1 flake at 0–20 cm and 15 burned rocks at 20–40 cm. About 25–30 m north-northwest of Shovel Test 1, Shovel Tests 2 and 3 were placed on opposite sides of the trail and excavated to 60 cm. Fourteen unburned Mammalia and Vertebrata bone fragments were recovered at 0–20 cm, and 7 burned rocks were found from 0 to 40 cm in Shovel Test 2. This material may be associated with Feature 1. Shovel Test 3 was devoid of cultural materials. Near the base of each shovel test, the matrix contained large carbonate nodules or pea-sized gravels. The testing results revealed that Subarea B had the potential to contain intact subsurface cultural deposits. Recommended testing to determine National Register eligibility consisted of a minimum of 2–4 m^2 of manually excavated 1x1-m test units (Kleinbach 2000:267–269).

Work Performed

On 12 July 2000, formal testing of Subarea B at 41CV1434 was completed (Figure 5.52). Feature 1, the previously recorded burned rock concentration, was re-located and appeared unchanged since 1997. Although previous investigators noted that the site measured 190x75 m, the site was decreased to 115x45 m. The excavations consisted of four backhoe trenches (Backhoe Trenches 1–4), one 1.5x1.0-m test unit (Test Unit 1), and three 1x1-m test units (Test Units 2–4); a total of 2.75 m^3 was manually excavated.

Backhoe Trench 1 was excavated near the western site margin and a few meters east of the tributary. The trench measured 8.50x0.70x0.95 m and was culturally sterile. Backhoe Trench 2 (10.0x0.7x1.3 m) was placed in the location of Feature 1. The east end of the trench crossed the feature, exposing burned rocks and mussel shells to approximately 40 cm. No dense cultural materials were observed, and the feature does not appear to represent a midden deposit. A probable hearth (later designated Feature 2) also was exposed at 40 cm in the south wall of the trench. Backhoe Trench 3 was located about 25 m southeast of Backhoe Trench 1 and measured 10.00x0.70x1.17 m. An occasional burned rock was noted at about 20 cm. Approximately 60 m south of Backhoe Trench 2, Backhoe Trench 4 was excavated at the southern site margin and measured 9.00x0.70x1.23 m. No cultural materials were found.

The four test units were terminated at dense gravels. Excavated to 70 cm, Test Unit 1 (the 1.0x1.5-m unit) was placed along the south wall of Backhoe Trench 2, above the probable hearth. Terminated at 60 cm, Test Unit 2 was located about 8 m north of Backhoe Trench 2 and in the vicinity of previously excavated Shovel Test 2. Test Unit 3 was placed ca. 15 m south of Backhoe Trench 2. The unit was halted

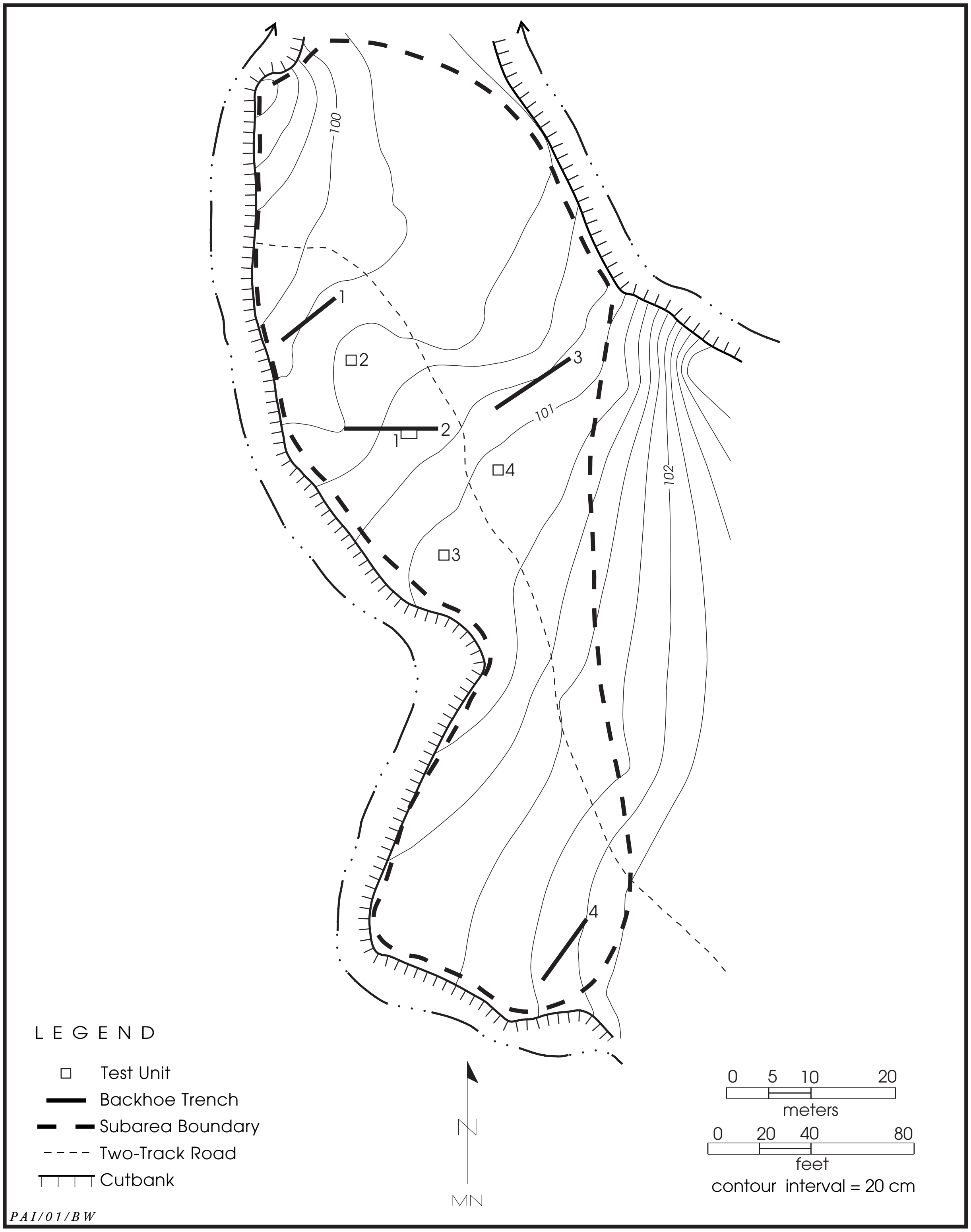

Figure 5.52. Site map of 41CV1434-B.

at 50 cm. Excavated to 60 cm, Test Unit 4 was situated along the east edge of a north-south two-track road about 8 m southeast of Backhoe Trench 2.

Site Extent and Depth

The terrace is bordered by the colluvial slope to the east and tributary to west. Past investigations indicate that the site has maximum dimensions of 115 m north-south by 40 m east-west, although the terrace extends about 30 m north and south beyond the established boundaries. One spatially discrete cultural component is buried at 10–30 cm.

Sediments and Stratigraphy

The West Range alluvial deposits (Nordt 1992) underlying the T_1 were examined and described in two of the four backhoe trenches (Figure 5.53). These deposits consist of fine-grained sediments with dispersed gravels (ca. 20 percent) over a bed of clast-supported gravels with interstitial sandy clay loam sediments. The 98-cm-thick profile of Backhoe Trench 2 is imprinted with an A-Bw-BC soil. The A horizon (0–32 cm) is a gravelly very dark gray sandy clay loam. The Bw horizon (32–46 cm) is a gravelly dark grayish brown sandy clay loam, and the BC horizon (46–98+ cm) is a very gravelly grayish brown sandy clay loam.

The alluvial deposits observed in Backhoe Trench 4 are similar, consisting of sandy clay loam sediments with dispersed gravels (ca. 5–10 percent) overlying a bed of clast-supported gravels. The 110-cm-thick profile exhibits an A-Bw-Bw2-C soil. The A horizon (0–30 cm) is a dark grayish brown sandy clay loam with subrounded (10 percent) gravels. The Bw horizon (30–68 cm) is a brown sandy clay loam with subrounded (10 percent) gravels. The Bw2 horizon (68–110 cm) is a brown sandy clay loam with a thin gravel bed at 105 cm below the surface. Underlying the soil is a bed of clast-supported gravels (110+ cm) designated a C horizon. Both profiles are typical of alluvial deposits preserved within the low-order streams and tributaries of Fort Hood's drainage network. Because these deposits occur near the peripheries of drainage basins where transport distance is minimal, they are characterized by poorly sorted sediments with mixed gravel and fine particle sizes.

Cultural Materials

A total of 164 artifacts was recovered from the four test units (Table 5.31). Some flakes and burned rocks were present in Test Unit 1 at 0–10 cm. Feature 2, a basin-shaped hearth, was encountered at 11 cm and extended to 53 cm (see Cultural Features). A dramatic increase in cultural materials, including two Ensor dart points, occurred in the sediment around the hearth at 10–30 cm. The unit was culturally sterile from 53 to 70 cm.

Ten of 17 levels excavated from Test Units 2–4 contained lithic artifacts or burned rocks. A discrete lens of cultural materials and more than 300 *Rabdotus* snail shells were encountered at 10–30 cm in Test Unit 3, and most of the cultural materials found in Test Unit 4 occurred at the same depth.

Cultural Features

In 1997, Feature 1 was defined as a 4–5-m-diameter burned rock concentration exposed in a two-track road. Cultural materials exposed from 0–40 cm in the eastern half of Backhoe Trench 2 indicate that Feature 1 is actually not a burned rock feature but rather a buried cultural zone that happens to contain some scattered burned rocks. Materials associated with this cultural zone are concentrated between 10 and 30 cm in Test Units 1, 3, and 4. This evidence suggests that the cultural zone is widespread and does not represent a discrete burned rock feature, as previously thought.

Feature 2 was present from 11 to 53 cm in Test Unit 1. The basin-shaped hearth has maximum excavated dimensions of 150 cm east-west by 100 cm north-south and consisted of three burned rock layers (n = 255, 219 kg). Approximately 95 percent of the burned limestone rocks were large, tabular pieces or slabs (up to 30x20x7 cm). Several were fractured in place, and most sloped toward the center of the hearth. Some rocks (most notably along the east edge) were also vertical. The remaining rocks were fist-sized and smaller angular or rounded fragments. Six flakes and an unmodified bone fragment were recovered from the feature fill. Charcoal collected at 11–53 cm yielded a conventional radiocarbon age of 2180 ± 40 B.P. (Beta 149112). One flotation

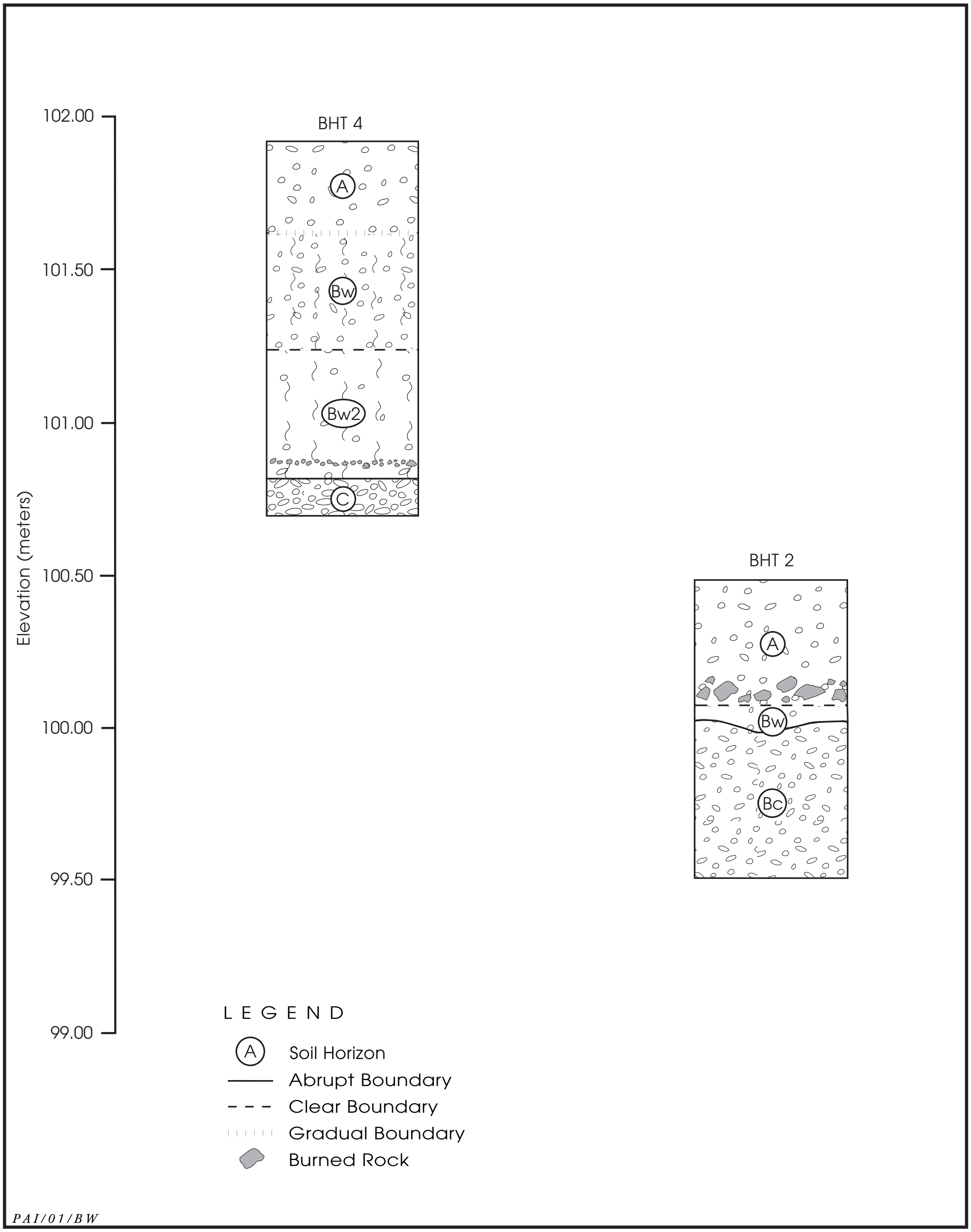

Figure 5.53. Profiles of Backhoe Trenches 2 and 4, 41CV1434-B.

Table 5.31. Summary of cultural materials from 41CV1434-B, Test Units 1–4

Provenience	Dart Points	Perforator	Early- to Middle-stage Biface	Late-stage to Finished Bifaces	Miscellaneous Uniface	Unmodified Debitage	Artifact Totals	Unmodified Bone	Burned Rock Counts	Burned Rock Weights (kg)
TEST UNIT 1										
Level 1 (0–10 cm)	–	–	–	–	–	4	4	–	15	0.50
Level 2 (10–20 cm)	1	–	–	2	1	77	81	–	62	8.50
Level 3 (20–30 cm)	1	–	–	1	–	26	28	–	59	7.00
Subtotals	2	0	0	3	1	107	113	0	136	16.00
Feature 2 (11–53 cm)	–	–	–	–	–	6	6	1	255	219.00
TEST UNIT 2										
Level 2 (10–20 cm)	–	–	–	–	–	–	0	–	2	0.25
Level 3 (20–30cm)	–	–	–	–	–	3	3	–	1	0.10
Level 4 (30–40 cm)	–	–	–	–	–	1	1	–	–	–
Level 5 (40–50 cm)	–	–	–	–	–	–	0	–	3	0.25
Subtotals	0	0	0	0	0	4	4	0	6	0.60
TEST UNIT 3										
Level 2 (10–20 cm)	–	–	–	–	–	15	15	–	7	0.50
Level 3 (20–30 cm)	–	1	1	1	–	12	15	–	12	2.50
Subtotals	0	1	1	1	0	27	30	0	19	3.00
TEST UNIT 4										
Level 1 (0–10 cm)	–	–	–	–	–	2	2	–	–	–
Level 2 (10–20 cm)	–	–	–	–	–	6	6	–	4	0.20
Level 3 (20–30 cm)	–	–	–	–	–	3	3	–	9	0.10
Level 4 (30–40 cm)	–	–	–	–	–	–	0	–	3	0.50
Subtotals	0	0	0	0	0	11	11	0	16	0.80
Totals	2	1	1	4	1	155	164	1	433	239.40

sample produced no charred macrobotanical remains, but a second sample contained Salicaceae along with *Acer* and *Quercus* spp. wood. Based on the hand excavation and the exposure provided by Backhoe Trench 2, the hearth was estimated to measure 200 cm in diameter. Roots had minimally disturbed the feature.

Discussion

Based on the excavation results, a stratigraphically discrete cultural component is contained within the West Range alluvium (A horizon). A calibrated radiocarbon date (2-sigma range) of 370–110 B.C. from Feature 2, a basin-shaped hearth, and two associated Ensor dart points indicate use of the area during the Late Archaic period. Wood fuel from the hearth consists of willow family, oak, and maple or boxelder. Although the feature intrudes into the underlying Bw and BC horizons, the associated cultural zone (formerly designated as Feature 1) around the hearth occurs at 10–30 cm. This archeological component is also present in two outlying test units and is represented by peaks in the frequency of stone artifacts and burned rocks. The excavations reveal that the component is horizontally discrete and extends over an area 20 m in diameter between and including Test Units 1, 3, and 4.

A total of 164 lithic artifacts consists of 9 tools and 155 flakes. Debitage is mainly noncortical flaking debris (n = 138, 89 percent), suggesting that cores as well as bifacial and flake blanks were likely produced at the source and then brought to the site. Also, the large percentage (n = 113, 72.9 percent) of debitage less than ¼ inch in size suggests that much of the reduction was focused on late-stage tool production. A qualitative examination of debitage-striking platforms reveals several lipped and faceted platforms diagnostic of late-stage soft-hammer biface thinning. A few small parallel-sided flakes with small lipped platforms are also present. These flakes are consistent with those produced by pressure flaking, which further supports the interpretation that late-stage tool production was the primary focus.

Of the known chert types at Fort Hood, Anderson Mountain Gray comprises 25 percent (n = 41) of the assemblage. Heiner Lake varieties (including Heiner Lake Blue, Tan, and Translucent Brown) are the second most abundant cherts identified (n = 17, 10.4 percent). The diversity of cherts from indeterminate sources (n = 91, 55.5 percent) likely represents variability within known bedrock sources or bedload cherts from the Table Rock Creek or Cowhouse Creek. A qualitative examination of cortex reveals the presence of rough and relatively unweathered as well as highly polished cortex, suggesting raw material acquisition from both upland lag gravel and bed-load sources. Because it contains intact cultural deposits with features, preserved organic remains, and a diverse artifact assemblage, 41CV1434-B is recommended as eligible for listing in the National Register.

CULTURAL MATERIALS RECOVERED

Christopher W. Ringstaff and Gemma Mehalchick

6

This chapter addresses all of the cultural materials recovered from 18 of the 19 tested prehistoric sites (none were recovered from 41BL989-B). These materials are categorized as chipped stone artifacts, ground and battered stone, modified bone, and modified shell. The 3,639 artifacts are summarized in Table 6.1. The remaining materials are classified as burned rocks (total weight = 4,194 kg), unmodified bones (n = 629), and unmodified mussel shells (n = 760). Lithic artifacts are grouped by the artifact classes summarized in Chapter 4 (see Table 4.2). Each artifact class and material group is discussed separately below.

CHIPPED STONE ARTIFACTS

The chipped stone artifact category consists of 3,629 specimens, including unmodified lithic debitage and tools. Lithic debitage constitutes 96.4 percent (n = 3,498) of the assemblage, and lithic tools, cores, and tested cobbles account for the remaining 3.6 percent (n = 131). All chipped stone artifacts are produced from fine-grained chert, and 32.1 percent (n = 1,164) are qualitatively identified as locally occurring Edwards cherts based on chert taxonomies established by Abbott and Trierweiler (1995b), Dickens (1993a and 1993b), and Frederick and Ringstaff (1994). The Fort Hood chert taxonomy is summarized in Chapter 4 (see Table 4.4). The remaining 67.9 percent (n = 2,465) of the artifacts cannot be positively identified as local or nonlocal cherts. Projectile points and preforms (Table 6.2), which include both arrow and dart points, make up only 0.7 percent of the total chipped stone assemblage. Of the 27 specimens recovered, 8 are arrow points, 1 is an arrow point preform, and 18 are dart points. Christopher Ringstaff assigned the projectile points to type categories using morphological and technological characteristics Prewitt (1981), Suhm and Jelks (1962), and Turner and Hester (1993) described. Collins (1985) or Turner and Hester (1993) assign the 13 typed projectile points to the following cultural periods: Early Archaic (Uvalde), Late Archaic (Pedernales, Martindale, and Ensor); Late Prehistoric, Austin Phase (Scallorn); and Late Prehistoric (Bonham).

Arrow Points

Eight arrow points were recovered from four sites (Table 6.3; Figure 6.1). Six are typeable and consist of five Scallorn points and one Bonham point, and the rest are a stem fragment and a medial fragment that cannot be identified to type.

Bonham

A single specimen (see Figure 6.1) was recovered from 41BL142-A. This arrow point exhibits one straight and one concave lateral edge and is missing one barb and the distal tip. The specimen is identified as being made of Cowhouse White chert from the Southeast Range chert province.

Scallorn

Of the five Scallorn specimens recovered from 41BL43, 41BL142-A, 41BL488-A, and 41BL589-B (see Figure 6.1), two are complete, one is nearly complete, and two lack distal tips. The complete and nearly complete points are relatively short (ranging from 18.7 to 21.3 mm in length), with concave lateral edges on two of the specimens suggesting considerable reworking. Straight to

Table 6.1. Summary of artifacts recovered*

Site	Analysis Unit	Arrow Points	Arrow Point Preform	Dart Points	Perforator	Early- to Middle-stage Bifaces	Late-stage to Finished Bifaces	Miscellaneous Bifaces	Side Scraper	End-Side Scraper	Miscellaneous Unifaces	Spoke Shaves	Cobble Tool/Chopper	Graver	Edge-modified Flakes	Cores	Tested Cobbles	Unmodified Debitage	Metate	Mano/Hammerstone	Modified Bone	Modified Shells	Totals
41BL43	–	1	–	–	–	–	4	–	–	–	–	1	–	–	5	1	–	444	–	–	–	–	456
41BL142-A	–	2	–	–	–	1	1	–	–	–	–	–	–	–	1	–	–	127	–	–	–	–	132
41BL231-B	–	–	–	–	–	–	–	–	–	–	–	2	–	–	1	–	–	62	–	–	–	–	65
41BL231-D	–	–	–	1	–	–	–	–	–	–	–	–	–	–	1	–	–	27	–	–	–	–	29
41BL488-A	–	2	–	–	–	2	2	1	–	–	–	–	–	–	10	–	–	669	–	–	–	4	690
41BL490	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	24	–	–	–	–	24
41BL491	–	–	–	1	–	–	2	–	–	–	1	–	–	–	–	–	–	339	–	–	–	–	343
41BL589-B	–	3	–	–	–	–	–	–	–	1	–	1	–	–	1	–	–	221	–	–	–	–	227
41BL991-B	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	2
41BL991-B	2	–	–	5	–	5	3	–	–	–	–	–	1	–	5	2	2	500	1	–	–	–	524
41BL991-B	3	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	7	–	–	–	–	8
41BL993-B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	2
41BL1039-B	–	–	–	6	–	1	–	–	–	–	–	–	–	–	–	–	–	27	–	–	–	–	34
41CV70-B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	–	–	–	–	2
41CV118-B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	108	–	–	–	–	109
41CV506-B	–	–	–	–	–	3	–	–	1	–	–	–	–	–	4	1	–	192	–	–	–	–	201
41CV580	1	–	–	–	–	1	1	–	–	–	–	–	–	–	3	1	–	44	–	–	–	1	51
41CV580	2	–	1	–	–	–	–	1	–	–	–	1	–	–	–	–	–	67	–	1	1	2	74
41CV580	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	16	–	–	–	–	16
41CV580	4	–	–	–	–	–	2	–	–	–	–	–	–	1	1	1	–	45	–	–	–	–	50
41CV580	5	–	–	–	–	1	–	–	–	–	–	–	–	–	1	5	–	120	–	–	–	–	127
41CV669-B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	1	35	–	–	–	–	38
41CV686-A	–	–	–	1	–	1	3	1	–	–	–	–	–	–	–	–	–	246	–	–	–	–	252
41CV730-B	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	19	–	–	–	–	19
41CV1434-B	–	–	–	2	1	1	4	–	–	–	1	–	–	–	–	–	–	155	–	–	–	–	164
Totals		8	1	18	1	16	22	3	1	1	2	5	1	1	34	13	4	3,498	1	1	1	7	3,639

* No artifacts were recovered from 41BL989-B.

Table 6.2. Summary of projectile points

	Arrow Points				Dart Points							
Site	Bonham	Scallorn	Untypeable	Preform	Ensor	Gower	Pedernales	Martindale	Uvalde	Untyped	Untypeable	Totals
41BL43	–	1	–	–	–	–	–	–	–	–	–	1
41BL142-A	1	1	–	–	–	–	–	–	–	–	–	2
41BL231-D	–	–	–	–	–	–	–	–	–	1	–	1
41BL488-A	–	1	1	–	–	–	–	–	–	–	–	2
41BL491	–	–	–	–	–	–	–	–	–	–	1	1
41BL589-B	–	2	1	–	–	–	–	–	–	–	–	3
41BL991-B	–	–	–	–	–	–	1	–	–	3	3	7
41BL1039-B	–	–	–	–	–	1	1	1	1	2	–	6
41CV580	–	–	–	1	–	–	–	–	–	–	–	1
41CV686	–	–	–	–	–	–	–	–	–	–	1	1
41CV1434-B	–	–	–	–	2	–	–	–	–	–	–	2
Totals	1	5	2	1	2	1	2	1	1	6	5	27

slightly convex lateral edges are noted on three specimens. Bases range from slightly convex on two specimens and straight on two specimens to concave on the remaining specimen. The raw material of the Scallorn point from 41BL43 is Heiner Lake Blue from the Southeast Range chert province, and one specimen from 41BL589-B is identified as Anderson Mountain Gray chert from the West Range chert province. The remaining specimens are made of indeterminate dark brown, light brown, and red chert.

Untypeable

Two untypeable arrow points consist of a medial and basal fragment recovered from 41BL488-A and 41BL589-B, respectively. The medial fragment shows serration, and the basal fragment appears to be an expanding stem. The specimens are made from indeterminate mottled and light brown chert.

Arrow Point Preform

A single arrow point preform (see Figure 6.1) was recovered from 41CV580. This point preform is crudely manufactured on a flake blank that retains the dorsal ridge (or arris) and has a smooth ventral surface. The preform has been shaped by bifacial pressure flaking of the lateral margins and distal and proximal ends. The specimen exhibits convex lateral edges and a small contracting stem with one well-formed notch and one smaller notch. The lateral edge retouch on one side is incomplete, leaving a flat unfinished edge on the lower half of the preform. The specimen has morphological and technological similarities to the Cliffton type (Elton Prewitt, personal communication 2000) and is made from an unidentified source of light brown chert. Some researchers believe the Cliffton type represents unfinished Perdiz points (Turner and Hester 1993:208).

Dart Points

Eighteen dart points were recovered from six sites (Table 6.4; Figure 6.2). Of these, two are complete, seven are nearly complete, and the rest are fragmentary. Seven of the specimens are classified to formal types, five specimens are untyped, and the remaining six are untypeable because of damage.

Ensor

Two Ensor specimens were recovered from 41CV1434-B (see Figure 6.2). One specimen is complete, and one is a proximal fragment. The complete point exhibits straight lateral edges,

Table 6.3. Classification and attributes of arrow points and arrow point preform

Point Type	Site	Analysis Unit	Completeness	Maximum Length	Blade Length	Blade Width	Haft Length	Neck Width	Base Width	Maximum Thickness	Chert Type
Scallorn	41BL43	–	proximal	21.9	15.6	13.4	6.6	5.8	9.5	3.0	Heiner Lake Blue
Bonham	41BL142-A	–	proximal	30.6	23.6	15.2	7.6	5.3	5.5	3.9	Cowhouse White
Scallorn	41BL142-A	–	proximal	19.9	15.1	13.5	6.0	6.3	9.9	3.4	indeterminate dark brown
Scallorn	41BL488-A	–	complete	18.7	12.9	10.8	5.8	2.3	9.5	3.2	indeterminate light brown
untypeable	41BL488-A	–	medial	11.4	–	10.8	–	–	–	3.3	indeterminate mottled
Scallorn	41BL589-B	–	nearly complete	21.3	13.6	14.3	7.3	6.2	12.4	3.7	Anderson Mountain Gray
Scallorn	41BL589-B	–	complete	20.9	14.5	11.6	7.1	6.2	11.7	3.4	indeterminate red
untypeable	41BL589-B	–	proximal	8.5	0.0	0.0	8.5	7.6	8.7	3.9	indeterminate light brown
preform	41CV580	2	complete	32.9	27.7	16.6	4.5	10.9	5.6	3.9	indeterminate light brown

Note: All measurements are in millimeters.

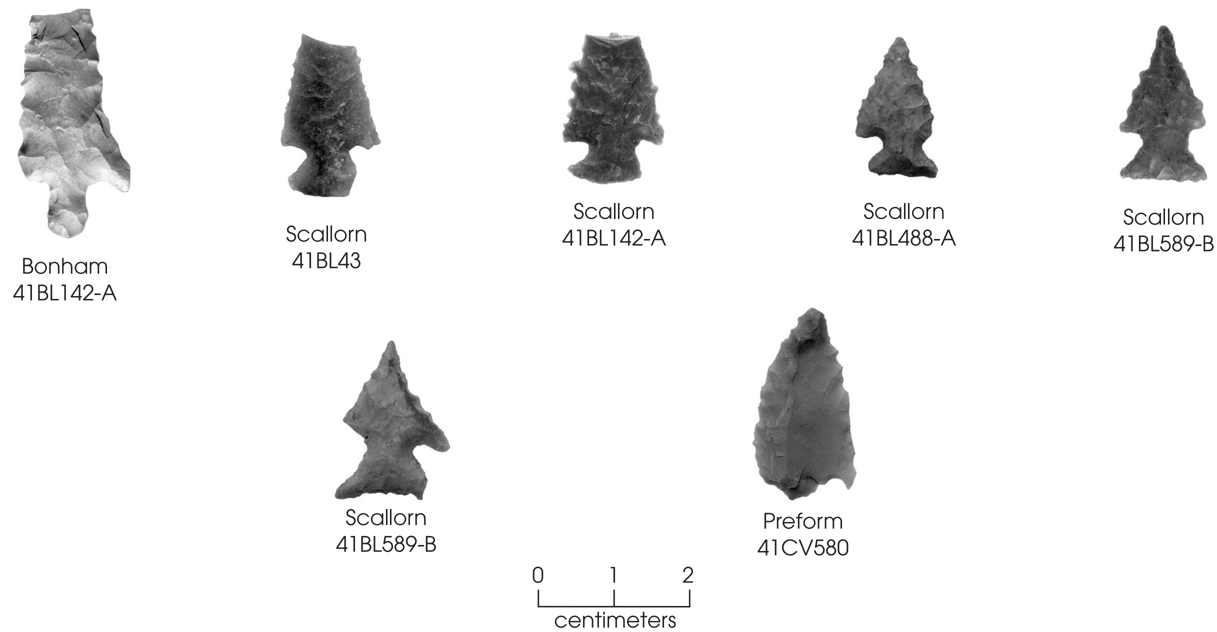

Figure 6.1. Arrow points and arrow point preform.

and the other specimen consists of an expanding stem base and part of one lateral edge. The base of the complete specimen is slightly convex, and the proximal fragment has a slightly concave base. The complete point is made of Heiner Lake Tan chert from the Southeast Range chert province, and the fragmentary specimen is Anderson Mountain Gray chert from the West Range chert province.

Gower

One Gower dart point (see Figure 6.2) was recovered from 41BL1039-B. The specimen is a proximal fragment with an impact fracture; it is made from heavily patinated indeterminate white chert.

Martindale

One Martindale dart point (see Figure 6.2) was recovered from 41BL1039-B. The specimen is a proximal fragment with a lateral snap; it is made from indeterminate light brown chert.

Pedernales

Two Pedernales dart points (see Figure 6.2) were recovered from 41BL991-B and 41BL1039-B. The specimen from 41BL991-B is a proximal fragment with a lateral snap; it is made from indeterminate light gray chert. The specimen from 41BL1039-B is nearly complete, with damage to its distal tip that is likely from modern earth-moving activities at the site. Its raw material is an indeterminate light brown chert.

Uvalde

One Uvalde dart point (see Figure 6.2) was recovered from 41BL1039-B. The specimen is nearly complete, shows considerable resharpening, and is made from indeterminate light brown chert.

Untyped

Six untyped dart points (see Figure 6.2) were recovered from three sites (41BL231-D, 41BL991-B, and 41BL1039-B). One nearly complete specimen recovered from 41BL231-D shows slight damage to the base and is made from indeterminate dark brown chert. Given the general morphology and attention to basal thinning, this specimen may represent a variant of the Fairland type. The three untyped

Table 6.4. Classification and attributes of dart points

Point Type	Site	Analysis Unit	Completeness	Maximum Length	Blade Length	Blade Width	Haft Length	Neck Width	Base Width	Maximum Thickness	Chert Type
untyped	41BL231-D	–	nearly complete	52.2	46.4	24.6	6.3	16.6	18.0	5.0	indeterminate dark brown
untypeable	41BL491	–	proximal	37.8	22.8	24.4	14.7	16.4	15.1	7.2	indeterminate mottled
Pedernales	41BL991-B	3	proximal	36.2	12.7	25.1	22.3	20.4	18.6	8.4	indeterminate light gray
untypeable	41BL991-B	2	proximal	17.7	12.3	22.2	–	13.2	13.2	6.0	indeterminate light gray
untypeable	41BL991-B	2	medial	19.9	19.9	18.1	–	–	–	4.1	indeterminate light gray
untypeable	41BL991-B	2	distal	23.9	23.9	15.7	–	–	–	3.8	indeterminate light brown
untyped	41BL991-B	2	nearly complete	34.4	24.5	16.2	–	14.2	–	5.2	indeterminate light gray
untyped	41BL991-B	2	nearly complete	33.7	22.9	28.5	12.4	15.4	15.3	6.1	indeterminate white
untyped	41BL991-B	1	proximal	43.4	28.9	28.1	15.4	14.0	15.4	7.5	indeterminate light brown
untypeable	41CV686-A	–	nearly complete	47.5	39.6	22.8	10.0	14.9	0.0	5.8	Gray-Brown-Green
Gower	41BL1039-B	–	proximal	27.8	16.0	21.8	14.7	15.1	16.5	5.6	indeterminate light brown
Martindale	41BL1039-B	–	proximal	33.2	20.7	32.3	11.8	17.2	19.2	6.0	indeterminate white
Pedernales	41BL1039-B	–	nearly complete	87.1	66.3	36.5	20.8	21.1	21.1	8.8	indeterminate light brown
Uvalde	41BL1039-B	–	nearly complete	32.8	19.7	19.8	12.7	13.1	18.1	6.5	indeterminate light brown
untyped	41BL1039-B	–	nearly complete	42.9	29.1	37.1	14.4	15.6	16.4	8.2	indeterminate light brown
untyped	41BL1039-B	–	complete	43.1	30.1	23.4	13.9	17.3	14.7	8.0	indeterminate mottled
Ensor	41CV1434-B	–	proximal	18.8	9.3	25.3	9.2	19.2	21.6	6.2	Anderson Mountain Gray
Ensor	41CV1434-B	–	complete	64.0	54.8	24.4	10.2	16.7	22.7	6.1	Heiner Lake Tan

Note: All measurements are in millimeters.

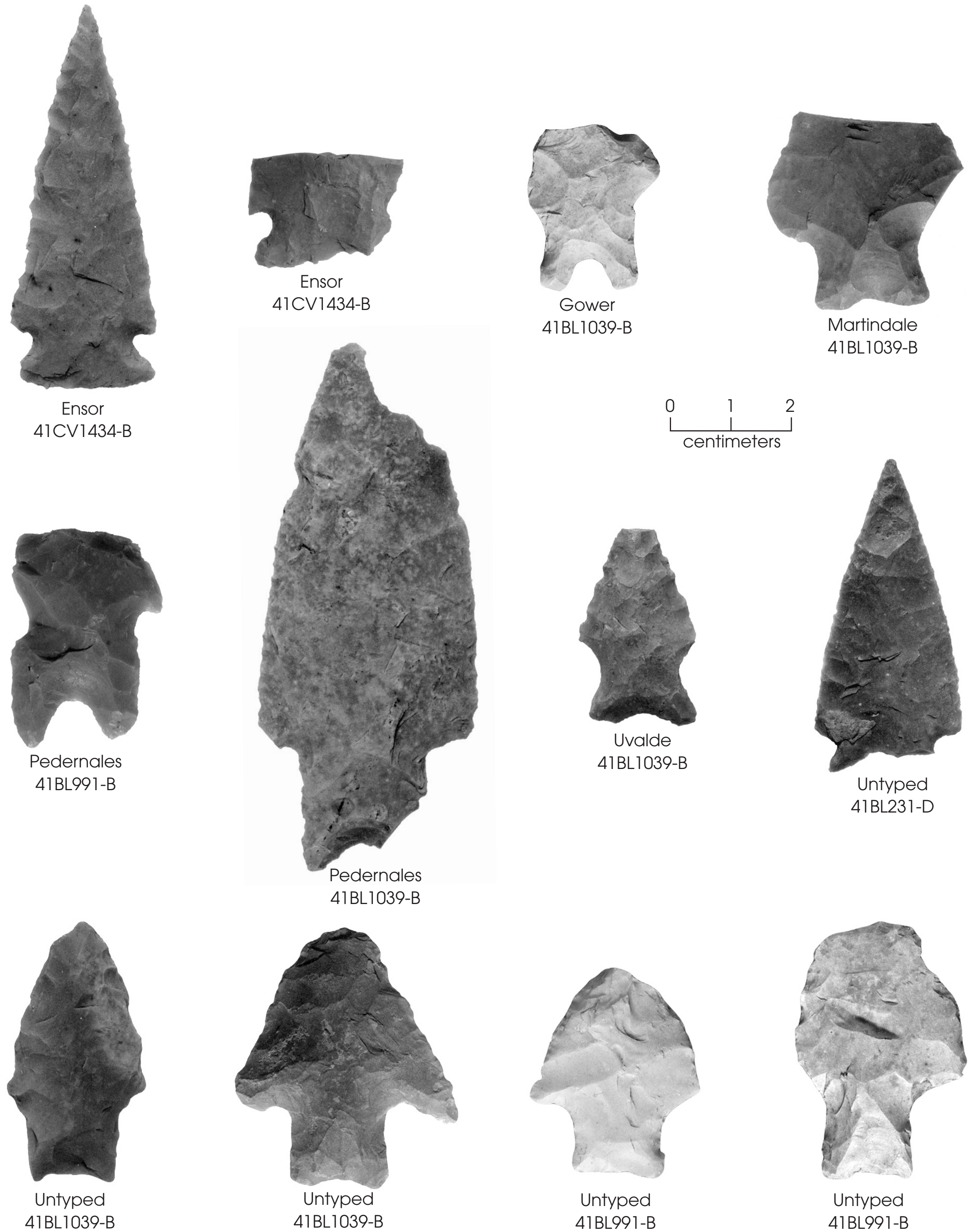

Figure 6.2. Dart points.

specimens from 41BL991-B are a proximal fragment made of indeterminate light brown chert and two nearly complete specimens made of indeterminate white and indeterminate light gray chert. A complete specimen made of indeterminate mottled chert and a nearly complete specimen of indeterminate light brown were recovered from 41BL1093-B. The nearly complete specimen is a close facsimile of the Marshall type, but its light basal grinding and blade beveling are uncharacteristic of the type (Elton Prewitt, personal communication 2000).

Untypeable

Five untypeable dart points were recovered from 41BL491, 41BL991-B, and 41CV686-A. One specimen recovered from 41BL491 is a proximal fragment of indeterminate mottled chert with an oblique snap. Three untypeable points were recovered from 41BL991-B. These consist of one proximal and one medial fragment made of indeterminate light gray chert and one distal fragment made of indeterminate light brown chert. The remaining specimen, from 41CV686-A, is nearly complete and exhibits a broken base and distal tip with partial removal of the patinated surface of both faces by pressure flaking, which suggests the specimen was reworked after patination formed on the artifact surface. This point is made of the Gray-Brown-Green chert from the North Fort Hood chert province.

Perforator

A single perforator (see Table 6.1) from 41CV1434-B consists of a medial fragment made from indeterminate dark gray chert.

Bifaces

Forty-one bifaces were recovered from 10 sites (Table 6.5; Figure 6.3) and are classified into three analytical categories—early- to middle-stage, late-stage to finished, and miscellaneous. The early- to middle-stage category (n = 16, 39.0 percent) includes bifaces that exhibit initial bifacial edging of a cobble or flake blank and may also show initial bifacial thinning. Bifaces in this category may or may not have cortex. The late-stage to finished category (n = 22, 53.7 percent) includes those specimens that exhibit secondary bifacial thinning and may also exhibit pressure margin trimming and edge straightening. Finally, the miscellaneous biface category (n = 3, 6.8 percent) is a catchall for bifacially modified specimens that are too incomplete or otherwise unrecognizable to classify as early- to middle-stage or late-stage to finished bifaces.

Table 6.6 categorizes the completeness of bifaces in the assemblage. Within the early- to middle-stage category, indeterminate fragments are the most common (43.8 percent) of the specimens. Of the 22 specimens in the late-stage to finished category, distal fragments are the most frequent at 31.8 percent. Four (18.2 percent) of the late-stage to finished bifaces exhibit retouched lateral edges and appear to be finished.

Biface morphology is variable, with proximal fragments exhibiting the most variability of form. Of the eight proximal fragments examined, one is triangular, two are subtriangular, three are ovate, and the remaining two specimens are indeterminate because of damage. Only one of the late-stage to finished bifaces is classifiable as a named type. The proximal fragment recovered from 41CV686-A shows morphological and technological characteristics of a Friday biface (Turner and Hester 1993:254).

Table 6.5. Summary of bifaces by analytical category

Site	Early- to Middle-stage	Late-stage to Finished	Miscellaneous Bifaces	Totals
41BL43	–	4	–	4
41BL142-A	1	1	–	2
41BL488-A	2	2	1	5
41BL491	–	2	–	2
41BL991-B	5	3	–	8
41BL1039-B	1	–	–	1
41CV506-B	3	–	–	3
41CV580	2	3	1	6
41CV686	1	3	1	5
41CV1434-B	1	4	–	5
Totals	16	22	3	41

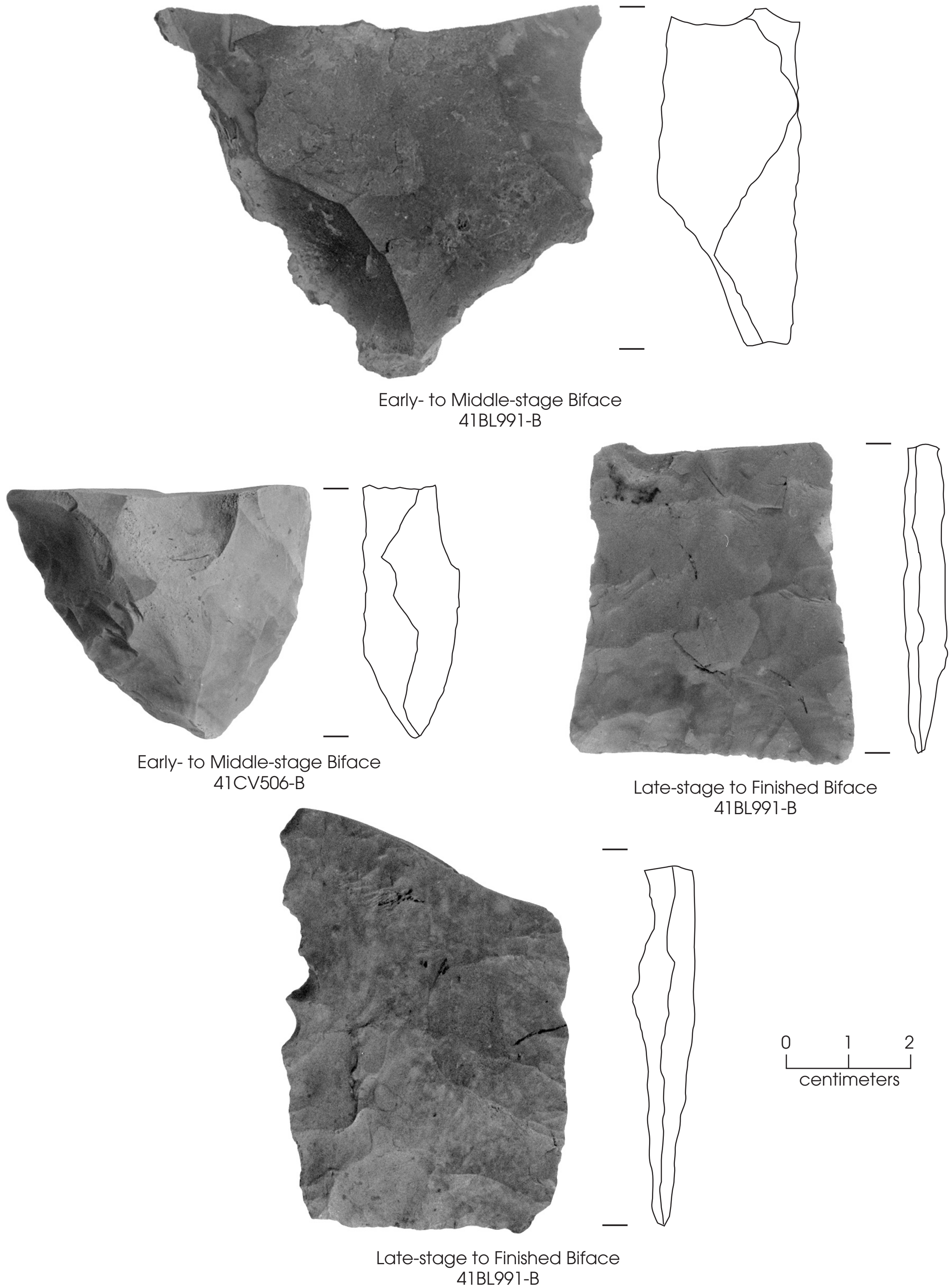

Figure 6.3. Bifaces.

Table 6.6. Summary of bifaces by completeness and analytical category

Completeness	Early- to Middle-stage	Late-stage to Finished	Miscellaneous Bifaces	Totals
complete	–	–	–	0
nearly complete	4	–	–	4
proximal fragment	2	6	–	8
medial fragment	1	2	–	3
distal fragment	1	7	–	8
edge fragment	1	3	–	4
indeterminate fragment	7	4	3	14
Totals	16	22	3	41

Twenty-three of the 41 bifaces recovered are identified as known chert types from the Fort Hood area. Biface frequency by chert type consists of:

Anderson Mountain Gray	2
Cowhouse White	5
Fort Hood Gray	3
Fort Hood Yellow	5
Gray-Brown-Green	6
Heiner Lake Blue	1
Owl Creek Black	1

The remaining 18 specimens were made of indeterminate light gray, dark gray, dark brown, and mottled chert.

Unifaces

Four unifaces recovered from four sites (Table 6.7) are classified into three categories: end-side scraper, side scraper, and miscellaneous uniface. One end-side scraper (Figure 6.4) is a proximal fragment with its distal end apparently truncated by a blow to the ventral surface (possibly an attempt at edge removal for rejuvenation). The distal end was later modified but only halfway across the break. The specimen is made of Gray-Brown-Green chert from the North Fort chert province. The one side scraper (see Figure 6.5) is complete and is made on the lateral edge of a flake of mottled chert from an indeterminate source. The miscellaneous uniface category includes unifacially modified specimens too incomplete to be classified or otherwise unrecognizable as either end-side scrapers or side scrapers. The remaining two specimens are classified as miscellaneous unifaces. One is a distal fragment made of Heiner Lake Blue chert, and the other is an indeterminate fragment made of indeterminate light brown chert.

Spokeshaves

Spokeshaves are expedient tools that are generally made on flakes and exhibit a semicircular indention. Five spokeshaves were recovered from four sites (Figure 6.5), and all are complete, unifacially modified specimens. One is made of Cowhouse White chert, and the other four, of indeterminate dark gray, light brown, dark brown, and mottled chert.

Cobble Tool or Chopper

A single cobble tool (see Figure 6.5) was recovered. It consists of a stream-rolled cobble with bifacial modification of one end. The specimen exhibits several step-and-hinge fractures that occur along the entire working edge of the tool. This sort of macroscopic use wear is diagnostic of heavy impacts consistent with use as a chopper (Odell 1981:206).

Graver

A single graver (see Figure 6.5) was identified. A flake with one unifacially modified lateral edge and two pointed projections, the

Table 6.7. Summary of unifaces by analytical category

Site	End-side Scraper	Side Scraper	Miscellaneous Unifaces	Totals
41BL491	–	–	1	1
41BL589-B	1	–	–	1
41CV506-B	–	1	–	1
41CV1334-B	–	–	1	1
Totals	1	1	2	4

specimen is nearly complete and is made from indeterminate light brown chert.

Edge-modified Flakes

Thirty-four edge-modified flakes were recovered from 10 sites (Table 6.8). Of these, 67.6 percent are complete or nearly complete, and the remaining 32.4 percent consist of various fragments. Fifteen specimens are composed of identified Fort Hood cherts, including Cowhouse White (n = 4), Fort Hood Yellow (n = 2), Gray-Brown-Green (n = 4), Heiner Lake Blue (n = 1), Heiner Lake Tan (n = 1), Owl Creek Black (n = 2), and Texas Novaculite (n = 1). The remaining 19 specimens are made of indeterminate mottled, dark gray, light brown, and dark brown cherts.

Cores

Thirteen chert cores were recovered from four sites. Of these, 12 (92.3 percent) exhibit cortex—9 have 1–50 percent cortex and 3 have 51–99 percent cortex. Six of the cores (46.2 percent) are made of identifiable Fort Hood chert types:

Fort Hood Yellow	1
Fossiliferous Pale Brown	1
Gray-Brown-Green	3
Heiner Lake Translucent Brown	1

Of the 7 remaining cores, 5 are made of indeterminate mottled chert and 2 are made of indeterminate light brown chert.

Tested Cobbles

Four tested chert cobbles were recovered from three sites. All of the specimens are complete and show minimal removal of the outer cortex. Materials include one Gray-Brown-Green, one indeterminate light brown, and two indeterminate mottled cherts.

Unmodified Debitage

Unmodified debitage is the largest lithic artifact category, consisting of 3,498 specimens, or 96.4 percent of all chipped stone artifacts collected (see Table 6.1). From this category, 1,037 (29.6 percent) complete specimens were recovered, along with 461 proximal fragments (13.2 percent), 1,864 chips (53.3 percent), and 136 chunks (3.9

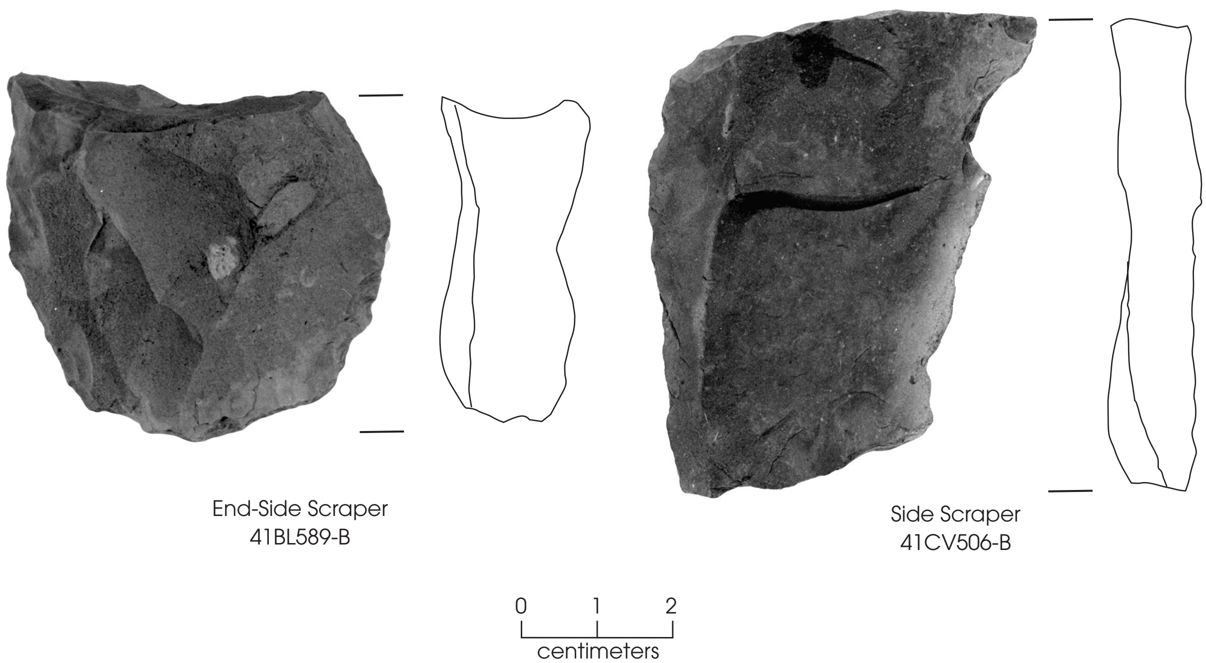

Figure 6.4. Unifaces.

percent). Table 6.9 notes the presence of cortex on the dorsal surfaces of these specimens. Noncortical debitage dominates the assemblage at 76.0 percent of the specimens, and the remaining cortical debitage accounts for 24.0 percent of the specimens. In the assemblage, 31.7 percent (n = 1,110) of the unmodified flakes were assigned to 18 known Fort Hood chert types. The remaining 2,388 specimens (68.3 percent) are composed of white, yellow, gray, brown, red, black, and mottled cherts from indeterminate sources. Size grading of the unmodified debitage is presented in Table 6.10.

GROUND AND BATTERED STONE

One complete metate was recovered from 41BL991-B (Figure 6.6). It is a large tabular slab of limestone measuring 34x30x7 cm and weighing 35.3 kg, with grinding on only one face. An ovate grinding basin, measuring 20x16 cm and 1.2 cm deep, exhibits heavy polish over a 16x11 cm area within the basin. Lighter polish is present around the margins of the grinding basin. Two special studies—one looking for preserved pollen and the other for organic residues—were conducted on this metate. A pollen wash was taken from the metate basin and sent to Dr. John G. Jones of the Palynology Laboratory at Texas A&M University. Fossil pollen grains were rare and so poorly preserved as to be largely uninterpretable. Environmental conditions in central Texas are not generally conducive to good pollen preservation, and this problem is exacerbated by repeated wetting and draining of the alluvial sediments where this metate was found.

For the second special study, a small block of limestone was cut from the central portion of

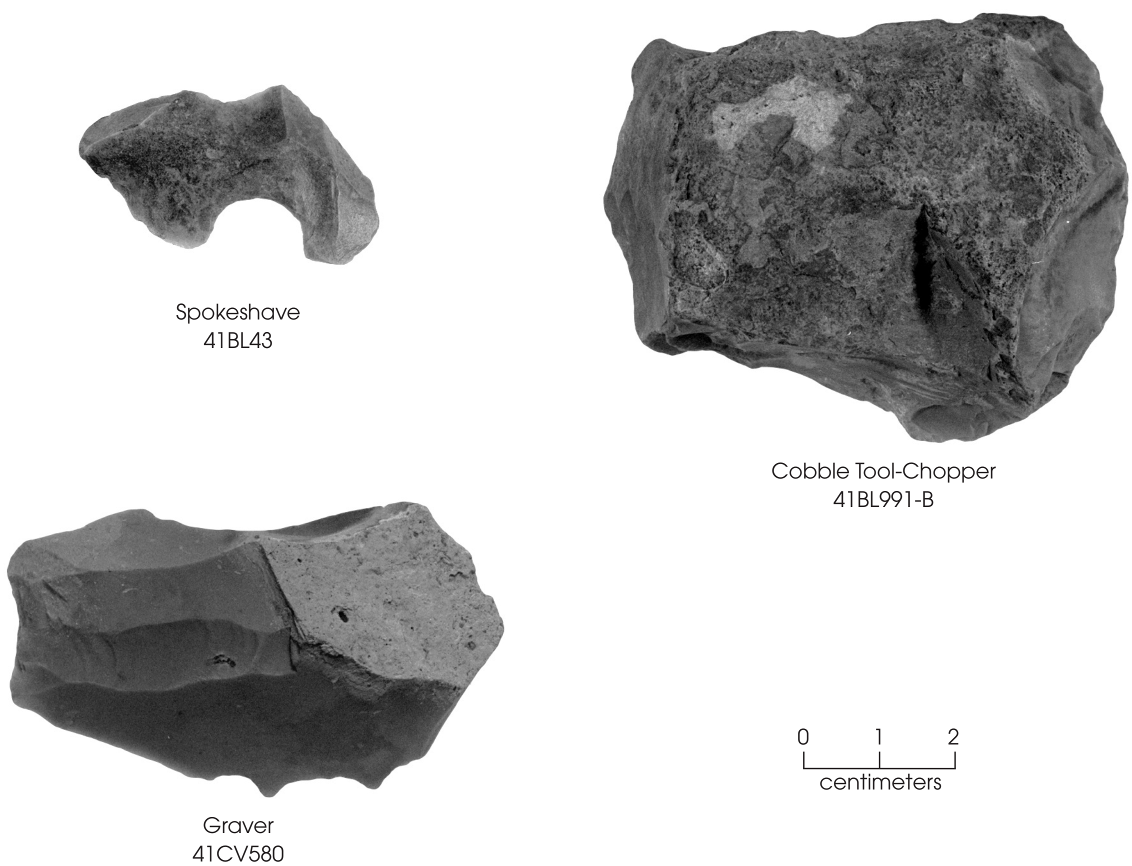

Figure 6.5. Spokeshaves, cobble tool or chopper, and graver.

the metate's basin using a drill with a cutting drill bit. The sample approximated a 3.5-cm cube but tapered toward its bottom to facilitate removal. The sample was sent to Dr. Mary Malainey of the Department of Native Studies, Brandon University, Manitoba, Canada, for organic residue analysis. The residues that were recovered strongly resembled that of a low fat plant, but insufficient fatty acids were recovered to make a firm identification (Mary Malainey, personal communication 2001).

Table 6.8. Summary of edge-modified flakes by completeness

Site	Complete	Nearly Complete	Proximal	Medial	Distal	Edge	Indeterminate	Totals
41BL43	4	–	–	–	1	–	–	5
41BL142-A	1	–	–	–	–	–	–	1
41BL231-B	–	–	1	–	–	–	–	1
41BL231-D	1	–	–	–	–	–	–	1
41BL488-A	8	1	–	–	–	1	–	10
41BL589-B	–	–	–	–	1	–	–	1
41BL991-B	2	1	1	–	1	–	–	5
41CV118-B	1	–	–	–	–	–	–	1
41CV506-B	1	–	1	2	–	–	–	4
41CV580	3	–	–	–	1	–	1	5
Totals	21	2	3	2	4	1	1	34

One ground and battered stone artifact from 41CV580 is identified as a mano or hammerstone. This specimen is a small red quartzite cobble, ovate with smooth, stream-rolled cortex. It is complete, measures 77x55x35 mm, and weighs 190 kg. This specimen exhibits grinding polish on one face from use as a mano and pitting on one edge consistent with use as a hammerstone. This type of quartzite cobble is relatively rare in the Fort Hood area. It does not occur locally in the Cretaceous limestones but does occur naturally in the upland lag gravels and occasionally in channel gravel deposits associated with major streams.

BURNED ROCKS

Sixteen (84.2 percent) of the 19 tested sites yielded a total of 4,197.45 kg of burned limestone rocks (Table 6.11). Burned rocks found in test units were quantified (counted and weighed) in the field and discarded unless they appeared to be modified. Burned rocks present on the surface or in other exposures such as backhoe trenches or cutbanks were not quantified, but their presence was noted.

All of the burned rocks were limestone and appeared to be of local origin. The only noticeable distinction was between fossiliferous (typically pink to bright red when fired and containing many fossils) and nonfossiliferous (usually gray or bluish gray to dull red when burned and containing few, if any, inclusions) pieces. Most (93.5 percent) of the burned rocks observed in the hand excavations were from feature contexts.

FAUNAL REMAINS

Modified Bones

One bone modified for tool use was recovered at 41CV580; this specimen consists of the proximal portion of a subadult deer ulna (Figure 6.7). The tool resembles a flaker or spatulate. Most of the shaft is removed, and the end is shaped into a rounded tip. The artifact has a maximum length of 107.5 mm, but it is incomplete and shows a fresh break near the end of the tool.

Unmodified Bones

All vertebrate faunal remains from test units and backhoe trench exposures were collected. Eleven of the 19 tested sites produced a total of 629 animal bones (Table 6.12), and 20 taxa were identified (see Appendix C). Of these, 66 (10.5 percent) specimens exhibit spiral fractures, and 105 (16.7 percent) are charred or calcined. Site 41BL991-B contained slightly more than half (n = 352; 56.0 percent) of the bone assemblage.

Table 6.9. Summary of unmodified debitage by percentage of remaining dorsal cortex

Site	No Cortex	1–50% Cortex	51–99% Cortex	100% Cortex	Totals
41BL43	381	63	–	–	444
41BL142-A	105	20	2	–	127
41BL231-B	46	15	1	–	62
41BL231-D	22	3	2	–	27
41BL488-A	598	62	7	2	669
41BL490	20	1	2	1	24
41BL491	313	20	6	–	339
41BL589-B	166	44	7	4	221
41BL991-B	425	69	11	3	508
41BL993-B	–	1	–	–	1
41BL1039-B	24	3	–	–	27
41CV70-B	2	–	–	–	2
41CV118-B	36	46	13	13	108
41CV506-B	119	44	14	15	192
41CV580	140	98	41	13	292
41CV669-B	14	13	5	3	35
41CV686	102	83	58	3	246
41CV730-B	6	9	3	1	19
41CV1434-B	138	15	2	–	155
Totals	2,657	609	174	58	3,498

Modified Shells

Only two sites, 41BL488-A and 41CV580, yielded modified shells. At 41BL488-A, a disk-shaped bead of unidentifiable shell and a tubular bead of marine shell were recovered (see Figure 6.7). The disk bead is complete, has an outside diameter of 9.41 mm, and is 4.26 mm thick. A 2.1-mm-diameter hole through the center of the bead was drilled from both sides. A glossy sheen (like mother-of-pearl) is visible on one side of the specimen; the other surface is dull. The shell cannot be positively identified as freshwater mussel shell or marine shell. Hall (1981:211, Figure 48) describes and illustrates a similar form of marine shell disk bead from Allens Creek in south Texas (Austin County).

The marine shell bead is one-half of a tubular bead made of

Table 6.10. Summary of unmodified debitage by size categories

Site	<0.25 in. (<64 mm)	0.25–0.50 in. (64–130 mm)	0.50–1.00 in. (130–254 mm)	1.00–1.50 in. (254–381 mm)	1.5–2.0 in. (381–508 mm)	>2.0 in. (>508 mm)	Totals
41BL43	39	312	81	12	–	–	444
41BL142-A	–	94	21	9	3	–	127
41BL231-B	1	41	15	3	1	1	62
41BL231-D	–	12	14	1	–	–	27
41BL488-A	87	432	117	20	12	1	669
41BL490	3	12	9	–	–	–	24
41BL491	5	275	53	4	2	–	339
41BL589-B	9	163	24	17	5	3	221
41BL991-B	19	1	319	149	19	1	508
41BL993-B	–	–	–	1	–	–	1
41BL1039-B	–	–	12	13	2	–	27
41CV70-B	–	2	–	–	–	–	2
41CV118-B	1	57	25	21	3	1	108
41CV506-B	–	49	67	40	31	5	192
41CV580	5	99	121	58	7	2	292
41CV669-B	–	15	13	7	–	–	35
41CV686	–	138	69	22	15	2	246
41CV730-B	–	7	7	2	2	1	19
41CV1434-B	10	103	33	6	3	–	155
Totals	179	1,812	1,000	385	105	17	3,498

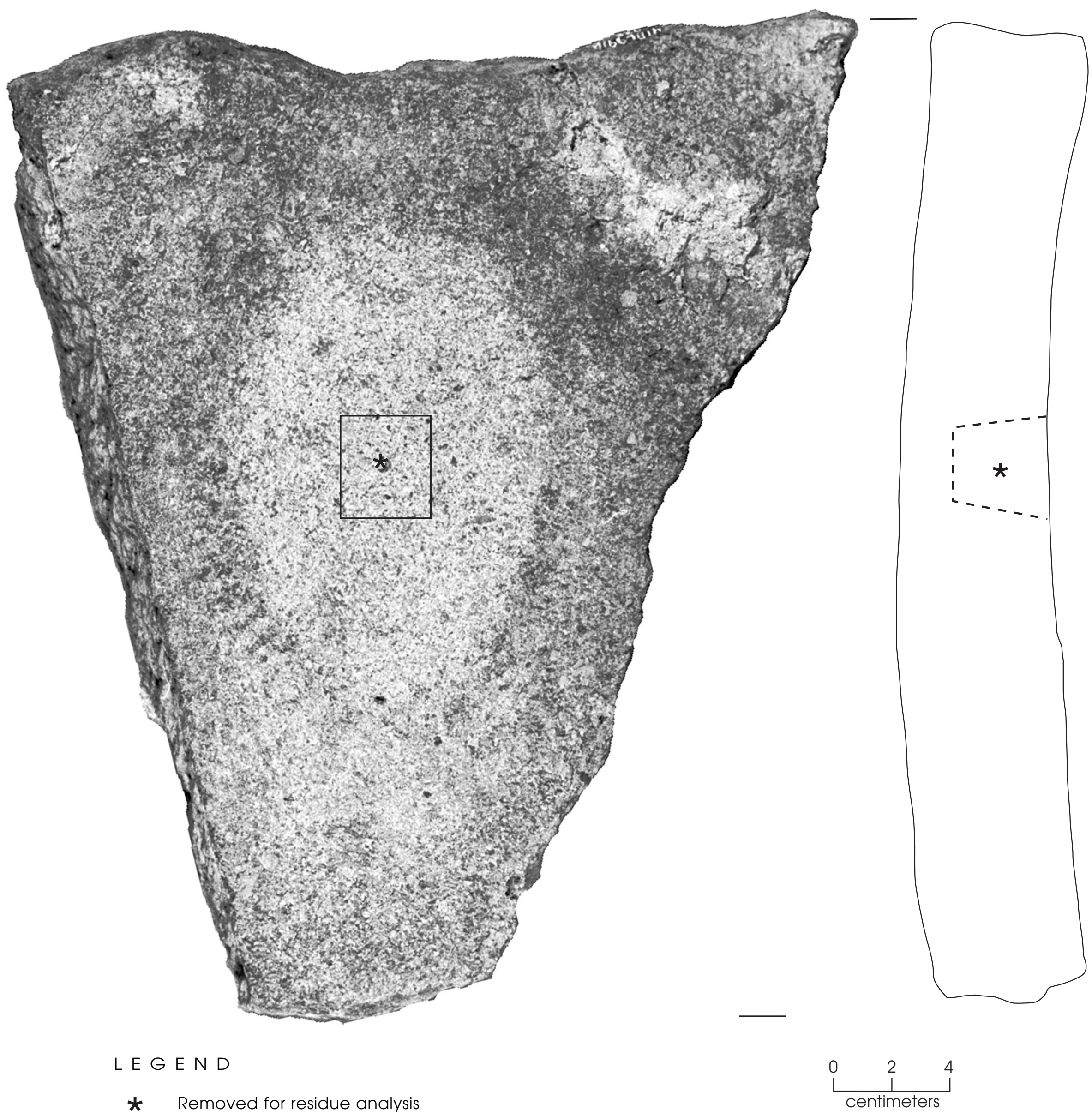

Figure 6.6. Metate from 41BL991-B.

the columella (or central core) of a large spiral gastropod, perhaps a conch or whelk, from the Texas coast. It matches the Form 1 beads that Hall (1981:208; Figure 48) describes and illustrates from Allens Creek. The specimen from 41BL488-A is a tubular piece of shell that was drilled from both ends, but the bead is split in half lengthwise. Its full length, 32.3 mm, is intact. The complete tubular bead would probably have been ovate to round in cross section and would have been at least 11.7 mm in diameter (the width of the fragment) and more likely 14–17 mm in diameter. The diameters of the drill holes on each end are estimated to be at least 5 mm and probably 6 or 7 mm. The drill holes are cone shaped and taper toward the center. They do not line up perfectly, being offset in the center of the bead. The bead appears to have been broken

Table 6.11. Summary of burned rocks observed

Site	Analysis Unit	Burned Rocks in Feature Contexts	Burned rocks in Nonfeature Contexts	Total Burned Rocks
41BL43	–	–	14.45	14.45
41BL142-A	–	–	0.85	0.85
41BL231-B	–	–	0.20	0.20
41BL231-D	–	105.50	14.65	120.15
41BL488-A	–	–	26.65	26.65
41BL490	–	–	0.95	0.95
41BL491	–	–	12.75	12.75
41BL589-B	–	9.00	2.70	11.70
41BL989-B	–	–	0.35	0.35
41BL991-B	1	–	1.95	1.95
41BL991-B	2	112.00	69.50	181.50
41BL991-B	3	–	0.70	0.70
41BL993-B	–	–	–	–
41BL1039-B	–	131.50	21.55	153.05
41CV70-B	–	–	–	–
41CV118-B	–	–	1.00	1.00
41CV506-B	–	–	0.20	0.20
41CV580	1	–	4.00	4.00
41CV580	2	–	2.00	2.00
41CV580	3	20.50	9.75	30.25
41CV580	4	–	27.00	27.00
41CV580	5	638.00	41.25	679.25
41CV669-B	–	–	0.10	0.10
41CV686-A	–	2,689.00	–	2,689.00
41CV730-B	–	–	–	–
41CV1434-B	–	219.00	20.40	239.40
Totals		3,924.50	272.95	4,197.45

Note: All measurements are in kilograms.

after its manufacture was complete. A thin ridge where the two drill holes come together is smoothed or polished, presumably worn from being suspended on a string. The bead's exterior surface is smoothed or polished.

Five freshwater mussel shells from 41BL488-A and 41CV580 are cut, with no other modification apparent. The ventral edge is removed from each specimen, from the posterior to anterior margin, with the umbo present on each. The absence of any wear on these specimens suggests that they represent waste byproducts (i.e., discarded pieces) from manufacturing ornaments or tools. The identified taxa consisted of an *Amblema plicata*, a *Lampsilis teres*, and 3 *Quadrula* spp. All of these taxa have been found at other prehistoric sites on Fort Hood and are presumed to have been obtained from nearby streams (Abbott and Trierweiler 1995a:66–67; Table 4.7).

Unmodified Mussel Shells

All unmodified freshwater mussel shell valves and fragments with umbos were collected and examined for completeness, thermal alteration, and possible identification (see Appendix D). Slightly more than one-third (n = 7) of the sites produced a total of 760 unmodified mussel shells (Table 6.13). Most (n = 668, 87.9 percent) were recovered from 41CV580, with species previously unidentified (e.g., *Quincuncina mitchelli*) at Fort Hood present in the assemblage. The most common identified species is *Amblema plicata* (n = 317, 41.7 percent), but 11 other species are represented. About 23 percent (n = 174) of the specimens are unidentified, primarily because they are highly eroded.

Snail Shell

The most common genus of snail shell found at 41CV595 is *Rabdotus*. These terrestrial snails occurred naturally throughout the Holocene. Although humans did on rare occasion modify these snails (Lintz and Tomka 1997), no modified *Rabdotus* were recovered from the site. When sufficient numbers were present, a sample of complete snails (between 6 and 15) was collected for potential amino acid epimerization analysis or AMS radiocarbon assay.

Botanical Remains

Charred plant remains found in archeological contexts are generally thought to

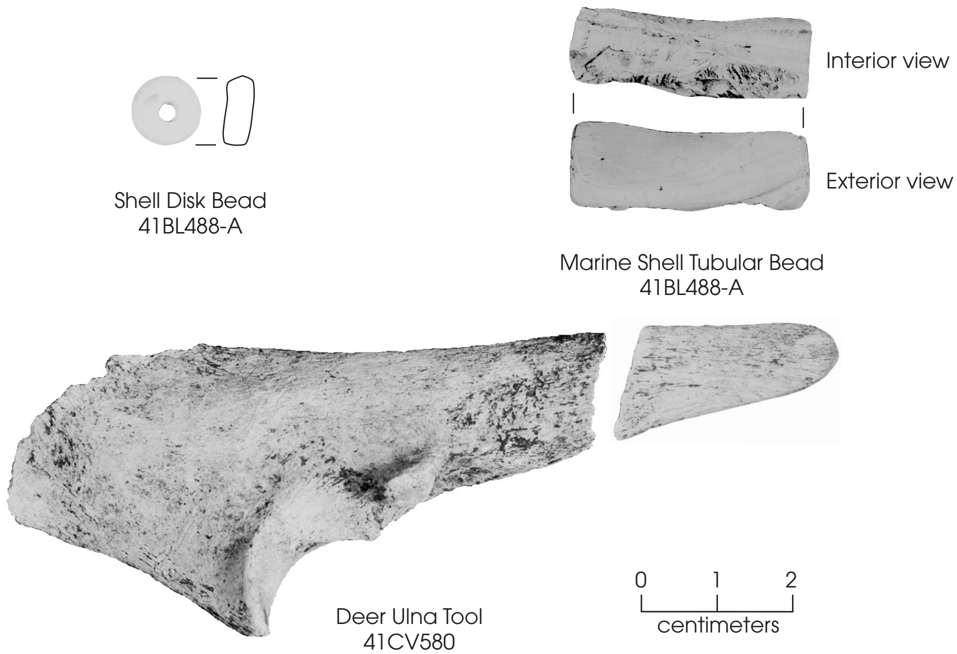

Figure 6.7. Modified bone and shell artifacts.

Table 6.12. Summary of unmodified vertebrate faunal remains recovered

Site	Analysis Unit	Spirally Fractured Bones #	Spirally Fractured Bones %	Burned Bones #	Burned Bones %	Total Bones
41BL43	–	7	9.6	8	11.0	73
41BL142-A	–	–	–	–	–	1
41BL231-B	1	5	21.7	4	17.4	23
41BL231-D	2	–	–	1	11.1	9
41BL488-A	–	3	30.0	6	60.0	10
41BL490	–	–	–	–	–	1
41BL491	–	–	–	1	25.0	4
41BL589-B	–	3	100.0	3	100.0	3
41BL991-B	1	2	5.9	1	2.9	34
41BL991-B	2	6	1.9	65	20.4	318
41BL991-B	3	–	–	–	–	–
41CV580	1	2	100.0	–	–	2
41CV580	2	2	22.2	1	11.1	9
41CV580	3	14	19.2	8	11.0	73
41CV580	4	21	45.7	6	13.0	46
41CV580	5	–	–	–	–	12
41CV686-A	–	1	10.0	1	10.0	10
41CV1434-B	–	–	–	–	–	1
Totals		66	10.5	105	16.7	629

Table 6.13. Summary of unmodified mussel shells recovered

Site	Analysis Unit	Number of mussel shells
41BL43	–	18
41BL231-B	1	1
41BL231-D	2	21
41BL488-A	–	27
41BL491	–	7
41BL589-B	–	17
41BL991-B	2	1
41CV580	1	25
41CV580	2	337
41CV580	3	68
41CV580	4	132
41CV580	5	106
Total		760

represent plants that humans burned, either accidentally or intentionally. Charred plant remains were recovered as 20 individual macroplant (i.e., charcoal) samples and in 40 flotation samples from nine sites (see Appendix E). Seventeen varieties of charred woods were recovered from nine sites, and plant remains representing possible food resources were found at seven sites (Table 6.14). Also, cane stem fragments that could have been used as arrow shafts were found at 41BL490.

Table 6.14. Summary of possible food resources represented in the charred botanical remains

Taxon	Common Name	Plant Part	41BL231-D	41BL490	41BL491	41BL991-B	41BL589-B	41CV580	41CV686-A
Quercus sp.	Oak	Acorn						X	X
Carya illinoiensis	Pecan	Nut							X
Carya sp.	Hickory	Nut		X	X	X	X		
Asclepias sp.	Milkweed	Seed						X	
Diospyros sp.	Persimmon	Seed							X
Panicum sp.	Panic Grass	Seed	X						
Prunus sp.	Plum	Seed	X						
Vitis sp.	Grape	Seed						X	
Total Number of Acorn/Nut/Seed Species Represented			2	1	1	1	1	3	3

SUMMARY AND INTERPRETATIONS OF GEOARCHEOLOGICAL AND ARCHEOLOGICAL DATA

Gemma Mehalchick and Douglas K. Boyd

7

Prehistoric occupations along the drainage basins of seven different streams or rivers that traverse the installation were investigated during the 2000–2001 field season (Table 7.1). The archeological investigations and materials recovered were described in Chapters 5 and 6. Most sites are situated within the Leon River drainage basin, encompassing the following major tributaries from north to south: the Leon River; Owl Creek; Bull Branch; Cowhouse Creek; Table Rock Creek; and South Nolan Creek. One site is on Clear Creek within the Lampasas River drainage basin.

Nine of the 19 investigated sites are recommended as eligible for listing in the NRHP because they have the potential to provide significant information on the prehistory of the region (Table 7.2). Given that these 9 sites contain discrete cultural components with chronological data, it is possible to make some conjectures about the prehistoric human inhabitants of these areas. This chapter divides the 9 sites into three site type groups based on topographic characteristics: rockshelters, burned rock mounds, and open campsites.

The 2000–2001 field investigations also recovered cultural materials and geomorphic information that provide insight into possible interregional trade, group mobility, and land use patterns of prehistoric peoples who inhabited central Texas. Several marine shell artifacts recovered from Fort Hood sites indicate connections with the Gulf Coast either through trade or movement of peoples. A brief discussion of marine shell artifacts from central Texas sites, including those on Fort Hood, is presented. Also, continuing National Register testing at Fort Hood is revealing useful information about the distribution of various late Holocene paleosols. The evidence for a widespread period of landscape stability during the late Holocene, ca. 1000 to 600 B.P., is summarized and presented.

ROCKSHELTERS

The slow and consistent erosion of the margins of the Manning surface led to formation of many rockshelters on Fort Hood (Nordt 1992:Figure 3). The process begins with the infiltration of groundwater through the highly permeable and soluble karstic Edwards limestone that forms the cap of the Manning surface. The water works its way down to the underlying impermeable Comanche Peak limestone. At this contact, ground water is discharged and causes shelter formation through spring sapping and the undercutting and removal of the lower portions of the Edwards limestone. Spring sapping has formed steep-walled, narrow valleys along the upland margins where headward erosion of drainages occurs. Rockshelters on Fort Hood are commonly located around the heads of small drainages where springs and seeps are found just below the Manning surface.

As archeological sites, rockshelters are defined as karst features where an overhanging erosion-resistant ledge was formed along a valley wall when the underlying layers eroded, and people lived underneath the protective ledge as sediments accumulated (Boyd et al. 2000:Table 6). When the four rockshelters tested in 2000–2001 (see Chapter 5) are combined with other previously tested shelters, it brings the total number of National Register-eligible rockshelter sites on Fort Hood to 61 (Boyd et al. 2000:Table B). There are 49 shelter sites on the east side of the military reservation, concentrated primarily

Table 7.1. Summary of cultural occupations at 19 prehistoric sites (20 subareas) tested in 2000–2001 season

Site	Site Type	Drainage	Analysis Unit	Geomorphic Setting	No. of Radiocarbon Dates	Temporal/Cultural Period of Occupations	Associated Features
ELIGIBLE							
41BL043	Rockshelter	Cowhouse Creek	–	upland, Manning surface rim	2	Late Prehistoric, Austin to Toyah phase	–
41BL231-D	Open campsite	Bull Branch tributary	–	T_1 terrace (tributary)	2	Late Archaic-Late Prehistoric transition	1
41BL488-A	Rockshelter	Bull Branch tributary	–	upland, Manning surface rim	2	Late Archaic-Late Prehistoric transition	–
41BL491	Rockshelter	Bull Branch tributary	–	upland, Manning surface rim	1	Late Archaic-Late Prehistoric transition	–
41BL589-B	Rockshelter	Bull Branch tributary	–	upland, Manning surface rim	1	Late Prehistoric, Austin phase	1
41BL991-B	Open campsite	South Nolan Creek and tributary	1	T_{1a} and T_{1b} terraces (creek and tributary)	1	Protohistoric	–
			2	T_{1a} terrace (creek and tributary)	5	Late Archaic-Late Prehistoric transition	1,2,3,4
			3	T_{1a} terrace (creek and tributary)	0	probably Late Archaic (no chronology data available)	–
41CV580	Open campsite/ burned rock midden	Leon River	1	toeslope and T_0 terrace	0	postdates Middle Archaic (no chronology data available)	–
			2	toeslope and T_0 terrace	1	Late Prehistoric, Toyah phase	–
			3	toeslope and T_0 terrace	1	Late Prehistoric, Austin phase	3
			4	toeslope and T_0 terrace	1	Late Archaic	–
			5	toeslope and T_0 terrace	2	Middle Archaic	1,2,4
41CV686-A	Burned rock mound	Owl Creek tributary	–	upland, Killeen surface	1	Late Prehistoric, Toyah phase	1
41CV1434-B	Open campsite	Table Rock Creek	–	T_1 terrace (tributary)	1	Late Archaic	1, 2
NOT ELIGIBLE							
41BL142-A	Rockshelter	Owl Creek tributary	–	upland, Manning surface rim	–	none defined	–
41BL231-B	Rockshelter	Bull Branch tributary	–	upland, Manning surface rim	–	none defined	–
41BL490	Rockshelter	Bull Branch tributary	–	upland, Manning surface rim	–	none defined	–
41BL989-B	Open campsite	South Nolan Creek	–	T_1 terrace	–	none defined	–
41BL993-B	Open campsite	South Nolan Creek tributary	–	T_1 terrace (tributary)	–	none defined	–
41BL1039-B	Open campsite	Clear Creek	–	T_0, T_1, and T_2 terraces	–	none defined	–
41CV70-B	Open campsite	Owl Creek tributary	–	T_1 terrace (tributary)	–	none defined	–
41CV118-B	Open campsite	Owl Creek tributary	–	T_0 and T_1 terraces (tributary)	–	none defined	–
41CV506-B	Open campsite	Owl Creek tributary	–	T_1 terrace	–	none defined	–
41CV669-B	Open campsite	Owl Creek tributary	–	T_0 and T_1 terraces	–	none defined	–
41CV730-B	Open campsite	Owl Creek tributary	–	toeslope and T_1 terrace (tributary)	–	none defined	–

Table 7.2. Summary of cultural features and chronological evidence at National Register-eligible sites

Site	Site Type	Analysis Unit	Temporally Diagnostic Artifacts	Feature No. and Type	Calibrated Radiocarbon Date (2-sigma range)
41BL43	Rockshelter	–	1 Scallorn arrow point	none	A.D. 770–980 and A.D. 1160–1280
41BL231-D	Open campsite	–	1 untyped dart point	F1: buried occupation zone	A.D. 690–900 and A.D. 780–980
41BL488-A	Rockshelter	–	1 Scallorn arrow point , 1 untypeable arrow point	none	A.D. 680–890 and A.D. 1000–1180
41BL491	Rockshelter	–	1 untypeable dart point	none	A.D. 650–780
41BL589-B	Rockshelter	–	2 Scallorn arrow points, 1 untypeable arrow point	F1: burned rock concentration	A.D. 890–1020
41BL991-B	Open campsite	1	1 untyped dart point	none	A.D. 1660–1950
		2	2 untyped dart points, 3 untypeable dart points	none	A.D. 1270–1390
				F1: basin-shaped hearth or earth oven	A.D. 810–1150
				F2: basin-shaped hearth	A.D. 690–970
				F3: flat hearth	A.D. 880–1010
		3	1 Pedernales dart point	F4: flat hearth	A.D. 1030–1250
41CV580	Open campsite/ burned rock midden	1	none	none	–
		2	1 arrow point preform	none	A.D. 1290–1410
		3	none	F3: basin-shaped hearth	A.D. 890–1020
		4	none	none	A.D. 140–380
		5	none	none	2200–1960 B.C.
				F1: burned rock midden	–
				F2: burned rock midden	2140–1920 B.C. and 2140–1910 B.C.
				F4: basin-shaped hearth	–
41CV686-A	Burned rock mound	–	1 untypeable dart point	F1: burned rock mound	A.D. 1260–1380
41CV1434-B	Open campsite	–	2 Ensor dart points	F1: burned rock concentration	–
				F2: basin-shaped hearth	370–110 B.C.

between Cowhouse and Owl Creeks. The other 12 shelter sites are situated in the northwest portion of the installation between Shell and Manning Mountains (Figure 7.1). These 61 sites actually contain 86 individual rockshelters (Table 7.3). Half of these shelters cannot be assigned to a cultural or chronological period because there are no temporally diagnostic artifacts or organic remains suitable for absolute dating because subsurface sampling is limited. The total volume of hand-dug test units at the 86 shelters ranges from 0 to 7.16 m^3, and only 8 shelters have had more than 2 m^3 of hand excavation (see Boyd et al. 2000:Table B). Some shelters have had only one or two shovel tests excavated in them, and no excavations have been done in many shelters. Excavations were generally halted at shelters where human remains were encountered.

Despite the paucity of data for some shelters, 43 of the 86 rockshelters have produced chronological evidence, and several contain multiple, stratified components. Of 62 components with defined ages, only two (possibly three) contain cultural deposits predating the Late Archaic. At rockshelter B at 41BL581-B, a few stone artifacts and unburned animal bones within a soil horizon that yields a late Pleistocene radiocarbon date of 9989–9282 B.C. on wood charcoal (Mehalchick et al. 1999:71–74) suggest a Paleoindian occupation. Rockshelter B at 41CV905-A produced a radiocarbon assay corresponding to the Middle-Late Archaic transition at around 4000 B.P. (Trierweiler 1996:397–409). Associated with this date is a concurrent peak in the frequency of stone artifacts, along with some faunal remains including a bison longbone fragment. Finally, a Gower point recovered from a shallow context in Rockshelter E at 41BL844-B may indicate an Early Archaic occupation during Collins' (1995) Martindale-Uvalde interval dating sometime around 6000 to 7000 B.P. (see Figure 3.1). Based on diagnostics, however, the disturbed deposits yielding the point appeared to be much younger (Trierweiler et al. 1996:104–117).

This skewed pattern of rare early occupations is well recognized at Fort Hood and probably reflects a geomorphic bias. Studies of rockshelter genesis suggest that formation processes actually destroy older shelters through roof collapse and remove older deposits from shelters through erosional stripping (e.g., Abbott 1995b; Boyd et al. 2000:46–47). It is not surprising, then, to find that 97 percent of the defined rockshelter components are assigned to the Late Archaic and Late Prehistoric periods. The overwhelming evidence from tested rockshelters at Fort Hood certainly appears to support the conclusions that few rockshelters are older than about 4,000 years and ancient sediments and human occupation debris are seldom preserved.

Intensity of rockshelter use appears to increase from the Late Archaic to the Late Prehistoric period. With only 21 components that may represent as much as 2,800 years, use intensity during the Late Archaic seems to be rather low. That there are 38 components for the ca. 800-year-long Late Prehistoric period suggests a much greater frequency of use. The geomorphic phenomenon mentioned above (i.e., shelter collapse and stripping of deposits) certainly may bias the Late Archaic sample, but how much this is a factor is not known. Within the Late Prehistoric period, Austin phase (A.D. 750–1150) occupations are slightly better represented (11 sites) than Toyah phase (A.D. 1150–1550) occupations (9 sites). There is no clear indication from testing why this is so. This difference may be negligible, however, because both cultural periods represent approximately 400 years and the use intensities appear to be roughly equal. Sites with Late Prehistoric components assigned to the Austin and Toyah phases are:

AUSTIN PHASE	TOYAH PHASE
41BL43	41BL43
41BL433	41BL433
41BL495	41BL495
41BL497	41BL754
41BL504-B	41BL773
41BL588-B	41BL929-D (Shelter C)
41BL773	41BL934 (Shelter B)
41BL797	41CV115-B
41BL934 (Shelter B)	41CV901
41CV115-B	
41CV1166-A	

It is notable that many shelters were occupied during the Austin and Toyah phases.

Overall, investigations at rockshelters on the installation demonstrate a wealth of prehistoric activities because the assemblages include hearths, middens, burned rock

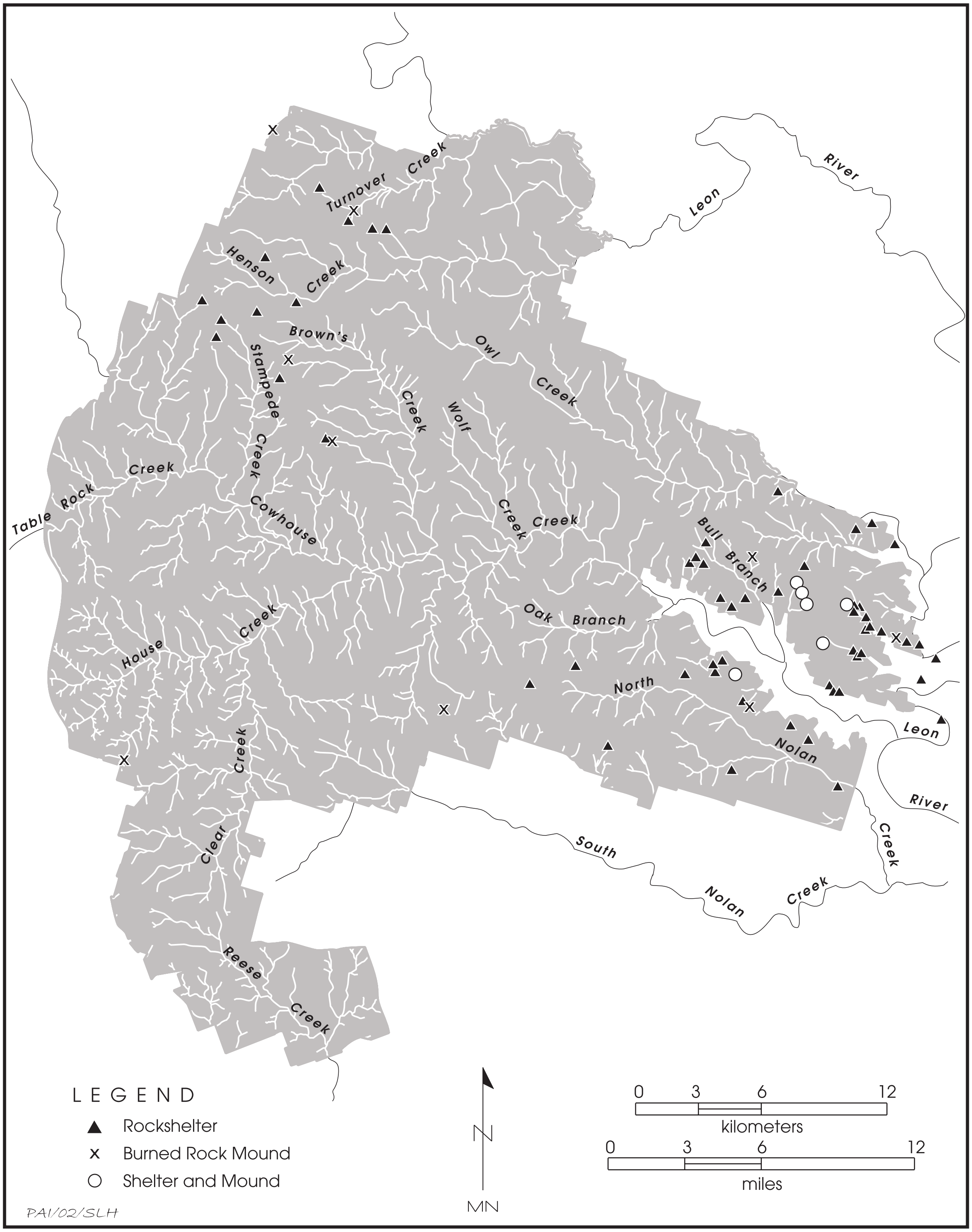

Figure 7.1. National Register-eligible rockshelter and burned rock mound sites on Fort Hood. The rockshelters situated east of Fort Hood are on land owned by the U.S. Army Corps of Engineers but are managed by Fort Hood.

Table 7.3. National Register-eligible rockshelters on Fort Hood (86 shelters at 61 sites)

Site	Shelter Designation	Human Remains Present*	Evidence of Looting Observed**	Age of Defined Components*: Paleoindian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric	Undefined	Hand-Excavated Test Units: Number	Volume (m^3)
41BL43		yes	yes	–	–	–	–	X	–	2	1.05
41BL69-C	Shelter B	yes	–	–	–	–	–	–	X	1	0.32
41BL168-B	Shelter C	–	–	–	–	–	X	–	–	2	1.50
	Shelter E	–	yes	–	–	–	X	X	–	3	0.87
41BL198-B		yes	yes	–	–	–	–	–	X	2	0.35
41BL233-B	Shelter C	–	yes	–	–	–	–	–	X	1	0.18
41BL433		–	possibly	–	–	–	–	X	–	3	1.45
41BL488-A		–	yes	–	–	–	X	X	–	3	1.20
41BL491		–	yes	–	–	–	X	X	–	1	0.45
41BL495		–	–	–	–	–	–	X	–	6	3.25
41BL496		yes	yes	–	–	–	–	X	–	5	2.60
41BL497		yes	–	–	–	–	X	X	–	4	1.93
41BL504-B		–	–	–	–	–	–	X	–	1	0.70
41BL537		–	–	–	–	–	–	–	X	0	0.00
41BL538		–	–	–	–	–	–	–	X	3	1.50
41BL539		–	–	–	–	–	–	–	X	0	0.00
41BL560-C	Shelter A	–	–	–	–	–	–	–	X	1	0.83
	Shelter G	–	–	–	–	–	X	–	–	2	1.14
41BL564-B		–	yes	–	–	–	–	–	X	0	0.00
41BL567		–	–	–	–	–	X	X	–	2	1.06
41BL568-B	Shelter C	–	–	–	–	–	–	–	X	2	0.37
41BL581-B	Shelter B	–	–	X	–	–	–	–	–	2	1.75
41BL582-A	Shelter A	–	–	–	–	–	X	–	–	2	1.50
41BL588-B		–	yes	–	–	–	–	X	–	0	0.00
41BL589-B		–	–	–	–	–	–	X	–	1	0.35
41BL590-A		–	–	–	–	–	–	–	X	1	0.49
41BL596		–	yes	–	–	–	X	X	–	1	0.40
41BL598-D	Shelter B	–	–	–	–	–	–	–	X	1	0.10
	Shelter D	yes	yes	–	–	–	–	–	X	1	0.10
41BL608-B	Shelter B	–	–	–	–	–	–	–	X	0	0.00

Table 7.3, continued

Site	Shelter Designation	Human Remains Present*	Evidence of Looting Observed**	Age of Defined Components*: Paleoindian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric	Undefined	Hand-Excavated Test Units: Number	Volume (m^3)
41BL637		–	–	–	–	–	–	–	X	0	0.00
41BL638		–	–	–	–	–	–	–	X	0	0.00
41BL670-C		–	yes	–	–	–	X	X	–	1	1.80
41BL671		yes	yes	–	–	–	X	X	–	5	7.16
41BL672		–	–	–	–	–	–	–	X	0	0.00
41BL675		probable	–	–	–	–	–	–	X	0	0.00
41BL684		–	–	–	–	–	–	–	X	0	0.00
41BL719	none (n=16)	–	10 of 16 looted	–	–	–	–	–	X (n=16)	0	0.00
41BL731		–	yes	–	–	–	X	–	–	1	0.40
41BL744-B		yes	yes	–	–	–	–	–	X	3	1.50
41BL754		probable	yes	–	–	–	–	X	–	2	2.00
41BL765		–	yes	–	–	–	–	–	X	3	1.00
41BL773		–	yes	–	–	–	–	X	–	5	2.58
41BL780	Shelter A	–	yes	–	–	–	–	–	X	0	0.00
	Shelter B	–	–	–	–	–	–	–	X	0	0.00
	Shelter C	–	–	–	–	–	–	–	X	0	0.00
41BL797		yes	–	–	–	–	X	X	–	1	0.70
41BL806		–	yes	–	–	–	X	X	–	1	0.30
41BL827		–	yes	–	–	–	–	X	–	2	0.75
41BL844-B	Shelter A	–	yes	–	–	–	X	X	–	2	0.88
	Shelter B	yes	yes	–	–	–	–	X	–	2	1.30
	Shelter D	–	–	–	–	–	–	X	–	1	1.26
	Shelter E	–	–	–	X (?)	–	–	X	–	2	1.47
41BL866	Shelter A	–	yes	–	–	–	–	X	–	4	5.58
41BL886	Shelter B	–	yes	–	–	–	–	–	X	3	1.14
41BL929-D	Shelter C	–	–	–	–	–	–	X	–	1	0.90
41BL934	Shelter A	–	yes	–	–	–	X	–	–	1	0.75
	Shelter B	–	yes	–	–	–	X	X	–	2	0.86
41CV53-C	Shelter D	–	–	–	–	–	–	–	X	1	0.08
	Shelter E	–	yes	–	–	–	X	X	–	1	0.15

Table 7.3, continued

Site	Shelter Designation	Human Remains Present*	Evidence of Looting Observed**	Age of Defined Components*						Hand-Excavated Test Units	
				Paleoindian	Early Archaic	Middle Archaic	Late Archaic	Late Prehistoric	Undefined	Number	Volume (m^3)
41CV115-B		–	yes	–	–	–	–	X	–	2	1.32
41CV125-C	Shelter B	yes	–	–	–	–	–	X	–	2	0.70
41CV901		yes	yes	–	–	–	–	X	–	1	0.20
41CV905-A	Shelter A	–	–	–	–	–	–	–	X	2	1.78
	Shelter B	–	yes	–	–	–	X	X	–	2	3.86
41CV935-B		yes	–	–	–	–	–	X	–	2	0.40
41CV1011	Shelter A	–	yes	–	–	–	X	X	–	3	2.70
41CV1080		–	–	–	–	–	X	X	–	1	0.90
41CV1085		–	–	–	–	–	–	X	–	4	3.20
41CV1166-A		–	–	–	–	–	–	X	–	1	0.40
41CV1169		–	yes	–	–	–	X	X	–	1	0.70
41CV1550		–	–	–	–	–	–	X	–	0	0.00
Totals		15	44	1	1	0	22	39	42	118	74.16

Note: Shaded areas represent sites where no test units or shovel tests have been excavated.
* Data are from Boyd et al. (2000:Table B) or this report.
** Data are from Boyd et al. (2000:Table 19) or this report.

concentrations and scatters, chipped and ground stone artifacts, vertebrate and invertebrate remains, ornamental items, nonlocal materials, and charred plant remains. And the use of rockshelters as burial sites is well documented throughout central Texas (Abbott 1995b; Abbott and Trierweiler, ed. 1995a:208–214; Boyd et al. 2000:46; Jackson 1933; Mehalchick et al. 1999:252–257). Human remains have been found at 13 (probably 15) of the 86 shelters at Fort Hood. It is very likely that additional human burials are present at shelters where little or no testing has been conducted and that many burials were removed or destroyed by past looting at other shelters. Unfortunately, almost half (48.8 percent) of the 86 shelters showed evidence of looting (see Table 7.3). The potential for burials to contain exotic artifacts such as marine shells, beads, and complete points makes them targets of looters eager to procure such items for sale.

Prehistoric activities at rockshelters can be seen as falling into two categories: social and spiritual. Social activities—represented by the habitation debris people living under the protective overhanging ledges generated—denotes acquisition and processing of plants and animals, manufacture of stone tools, and other everyday tasks. In contrast, the burials found in rockshelters refer to the more elusive aspects of prehistoric life, namely spiritual or ritual activity. The cumulative results of testing at many Fort Hood rockshelters since the 1970s provides considerable evidence about social organization but only a glimpse into the spiritual practices of the prehistoric past. Except for Jackson's (1933) excavation and reporting of rockshelter burials at 41BL3 nearly 70 years ago, no other human burials on Fort Hood have been investigated and reported.

BURNED ROCK MOUNDS

Interestingly, Fort Hood researchers have informally recognized a relationship between burned rock mounds and rockshelters. Burned rock mounds are massive accumulations of burned rocks with a distinctive dome-shaped or mounded morphology. They may occur as features within a site (such as at an open campsite), but they most often are found as isolated features in nondepositional upland and slope settings (Boyd et al. 2000:Table 6). The common occurrence of mounds on the Manning surface just above or near rockshelters suggests a possible functional relationship.

Most mounds on Fort Hood are small and shallow features ranging between 5 and 13 m in diameter and 30 to 150 cm in thickness. Although some mounds can yield thousands of artifacts, many contain only a few. The current project investigated one burned rock mound at 41CV686-A that dates to the Toyah phase (see Chapter 5). Including this site, 16 National Register-eligible sites have been investigated and contain 27 burned rock mounds (Table 7.4). Most of these mounds are located on the Manning surface, and only two (Feature 1 at 41CV686-A and Feature 1 at 41CV1378-A) are found on the lower, intermediate Killeen surface. All features rest on bedrock or residual, rubified sediments.

Looking at mound morphology, ethnographic research, and archeological investigations outside of Fort Hood, burned rock mounds appear to be cooking facilities primarily related to plant processing. They are thought to represent residue accumulated from repeated use of a single cooking pit or earth oven. Earth ovens have been identified in mounds found in various parts of central Texas (Decker 1997) and at three mound sites on Fort Hood: 41BL564-A (Abbott and Trierweiler 1995:208–214), 41BL608-A (see Chapter 5), and 41CV124 (Trierweiler, ed. 1994:205–206, 226–230). Earth ovens are also believed to be present at a few other sites on Fort Hood because the mounds have visible central depressions (Kleinbach et al. 1995:773–775, Table 9.1). Despite many test excavations of mounds at Fort Hood, there have been relatively few charred plant remains identified. Only one feature has yielded direct evidence to support the interpretation of mounds as plant processing features. Pecan nut fragments, persimmon seeds, and abundant oak acorns found in Feature 1 at 41CV686-A (see Chapter 5) suggest that these foods were being cooked in the oven or processed nearby while the oven cooking was taking place. Charred woods such as willow (family), hickory, hackberry, persimmon, sycamore, oak, and elm found in the mound were likely used as fuel. In the past, absence of plant remains has been attributed to poor preservation or reuse and cleaning of the pit, but limited flotation sampling and lack of detailed macrobotanical analyses may also contribute to the paucity of data recovered.

Table 7.4. National Register-eligible burned rock mound sites on Fort Hood

	Age of Defined Components**				Hand-Excavated Test Units	
Site*	Middle Archaic	Late Archaic	Late Prehistoric	Undefined	Number	Volume (m^3)
41BL198-A (n=2)	–	X	–	–	2	1.40
41BL233-C (n=5)	–	X	X	–	3	1.40
41BL554-B (n=2)	–	X	X	–	2	1.90
41BL564-A	–	–	X	–	1	0.84
41BL568-A (n=2)	–	–	–	X	2	2.13
41BL598-E	X	X		–	1	0.92
41BL608-A	–	X	X	–	1	0.57
41BL743	–	X	X	–	1	0.53
41BL877	–	–	–	X	0	0.00
41CV124	–	X	–	–	3	2.30
41CV339 (n=2)	–	–	–	X	0	0.00
41CV686-A	–	–	X	–	1	0.60
41CV903 (n=3)	–	–	–	X	0	0.00
41CV1092 (n=2)	–	X	–	–	3	1.50
41CV1195	–	X	–	–	1	0.55
41CV1378-A	–	X	X	–	1	0.78
No. of Components	1	10	7	4	22	15.42

Note: Shaded areas represent sites where no test units or shovel tests have been excavated.
* n is the number of burned rock mounds at a site if there is more than one.
** Data are from Boyd et al. (2000:Table B) or this report.

Returning to the posited relationship between rockshelters and burned rock mounds, it is interesting to note that the chronological data for mounds (see Table 7.4) mimics the data from rockshelters. No chronological assessment is possible for 8 mounds, and 3 sites have had no excavations conducted. Of the 18 defined components, however, only Feature 1 at 41BL598-E dates back to the Middle Archaic period based on radiocarbon assays (Trierweiler ed. 1994:205–206, 213–220, 247–249). The chronometric data from 12 other burned rock mound sites indicates occupation primarily during the Late Archaic and Late Prehistoric periods. At least half of these burned rock mound sites occur very near rockshelters (see Figure 7.1). This spatial patterning suggests that large-scale processing of relatively abundant plant resources found on and near the upland Manning surface coincided with rockshelter habitation. The mound and shelter sites are found in areas where people could have exploited the plant resources of the mixed woodlands that characterize the Manning surface, the riparian species found on the slopes along tributary drainages, and the grassland savannah vegetation on the Killeen surface (Ellis et al. 1994:19; Trierweiler 1994:15–16). The range of potential food plants processed and consumed at mounds and rockshelters is great, but only a few specific plants have been identified archeologically as probable food remains—pecans, oak acorns, and persimmon seeds (from mound at 41CV686-A) and unidentified bulbs (from rockshelter at 41BL797). Future research at Fort Hood should focus on identifying prehistoric food remains in the mounds and exploring the possible functional relationship between burned rock mounds and rockshelters.

OPEN CAMPSITES

Open campsite is a broad label applied to open sites containing lithic artifacts and burned rock debris associated with heating and cooking. These sites contain a diversity of artifacts and features that indicate a range of different activities (Boyd et al. 2000:Table 6). In contrast to rockshelters or burned rock mounds that are found only in specific topographic settings, open campsites are located across the landscape, although the best-preserved examples are found on terraces, toeslopes, and benches where rapid deposition sealed cultural materials in situ. The 2000–2001 field season investigated four open campsites with dated occupations ranging from the Middle Archaic to Protohistoric periods. These investigations revealed a variety of features and artifact assemblages that provide additional insight into prehistoric land use. For discussion purposes, these four open campsites are compared with other similar sites in the same drainage basins or in similar geomorphic settings.

Only two open campsites have been tested within the Bull Branch valley. Sites 41BL231-D, described in this report (see Chapter 5), and 41BL670, tested in the early 1990s (Carlson 1990:5–15; Trierweiler ed. 1994:A396–A399), are alike in many ways. They are situated within 2.5 km of each other within a deeply incised, narrow, spring-fed canyon that is subject to severe flooding and erosion. Both sites contain evidence of Late Archaic occupations, and the thinness of the cultural deposits suggests that fluvial activities may have removed any older deposits. No features were encountered at either site (excluding the midden deposits at 41BL670), but the floral and faunal remains denote a variety of riparian resources used for food and fuel.

Testing of 41CV1434-B in the 2000–2001 season brings the total number of open campsites along one tributary of Table Rock Creek to four. Site 41CV1434-B and two previously tested sites, 41CV1410-B and 41CV1432-B (Mehalchick et al. 2000:117–124, 131–138), are situated along a 1.25-km-stretch of the same tributary, which flows north into Table Rock Creek. The fourth site, 41CV1430 (Mehalchick et al. 2000:124–131), is 3 km to the north, at the confluence of the tributary with Table Rock Creek. Occupations on a strath terrace at 41CV1410-B and a T_1 at 41CV1434-B contain evidence of occupations during the Late Archaic and Late Prehistoric periods. A burned rock midden at 41CV1410-B produced sparse stone tools and debitage, but 41CV1434-B yielded a basin-shaped hearth and a high frequency of stone artifacts and debitage. Located downstream, 41CV1430 is on the higher T_{1a}, and 41CV1432-B is on the lower T_{1b}, and they contain occupations dating from Middle Archaic through Late Prehistoric periods. These sites represent a range of topographic settings within a complex and dynamic stream system, and the cultural remains they encompass appear to be equally diverse.

Although approximately 28.5 km apart, multi-component sites 41BL991-B on South Nolan Creek and 41CV580 along the Leon River each contain several features, diverse assemblages, and a significant soil marker (paleosol) recognized at other sites and localities in the region. The Pershing Park site, 41BL991-B, is located at the confluence of a prominent tributary with South Nolan Creek, and three different cultural components date from the Late Archaic to the Protohistoric period. Site 41CV580 on the Leon River also has five cultural components spanning from the Middle Archaic to the Toyah phase of the Late Prehistoric period. Both of these locales provided the inhabitants diverse and rich riparian habitats that were occupied repeatedly and intensively over thousands of years. Occupational evidence at these two sites includes stratigraphically separable cultural components found above, within, and below the cumulic paleosols that cap the West Range alluvium (see Regional Comparisons below). The buried soil at 41BL991-B is equivalent to the Tanktrail paleosol, and the buried soil at 41CV580 is identified as the Leon River paleosol.

The Ford alluvium overlying the paleosol at 41BL991-B contains occupational debris dated to the Protohistoric period (Analysis Unit 1), but archeological remains in the Ford alluvium at 41CV580 correspond to the Toyah phase of the Late Prehistoric period (Analysis Unit 2). The Protohistoric materials at 41BL991-B consist of unmodified bones, primarily of bison and bison-sized animals, that may represent animal butchering. Deposits of this age are rare on Fort Hood, and only two other sites (41CV174, situated along Table Rock Creek, and 41CV1553, a Paluxy site near Stampede Creek) have produced radiocarbon dates and associated remains (including Leon Plain ceramics and charred bulb fragments) of this age (Mehalchick et al. 2001; Abbott and Trierweiler, ed. 1995).

The Toyah phase occupations along the Leon River at 41CV580 produced ubiquitous mussel shells and the remains of frogs or toads and turtles, evidence of reliance on aquatic resources. Vertebrate and macrobotanical assemblages represent hunting and gathering, and specific identified food resources include deer, grape seeds, and yucca root. There is a similar Toyah phase occupation nearby on the Leon River at 41CV1480 (Mehalchick et al. 1999:130–134).

The best-defined cultural components at 41BL991-B and 41CV580 are those buried in the late Holocene paleosols. Four radiocarbon-dated features and a large sample of stone artifacts define a terminal Late Archaic into Austin phase component at 41BL991-B (Analysis Unit 2). Food resources exploited during this time include rabbit, vole, and canid- to deer-sized animals along with hickory nuts. Two components are buried within the paleosol at 41CV580. A Late Prehistoric, Austin phase occupation (Analysis Unit 3) includes evidence of oak acorn processing, and deer-sized neonatal bones suggest a late fall to spring occupation. Mussel shells and animal bones dominate a Late Archaic occupation (Analysis Unit 4).

Two cultural components are identified in the West Range deposits below the cumulic paleosols. Although it produced sparse lithic artifacts and burned rocks, a 20-cm-thick lens of cultural materials at 41BL991-B is tenuously assigned to the Late Archaic period (Analysis Unit 3) based on recovery of one diagnostic artifact–a Pedernales dart point. In contrast, burned rock middens, a hearth, and a zone of cultural materials at 41CV580 demonstrates recurrent use during the Middle Archaic period (Analysis Unit 5). The midden deposits provide the most information, producing a lithic assemblage dominated by cores and debitage representing various stages of reduction, as well as invertebrate faunal remains and a plethora of charred floral materials, including seasonal edible plants.

REGIONAL COMPARISONS

The 2000–2001 season investigations at Fort Hood have produced evidence important for understanding the prehistoric hunter-gatherer archeology of central Texas from a broader perspective. Two specific topics—the cultural implications of marine shell ornaments and the paleoenvironmental implications of late Holocene buried paleosols—are considered below.

Marine Shell Ornaments

Marine shell ornaments have now been recovered from three sites on Fort Hood. The 1933 University of Texas excavations in a rockshelter on the Willison Farm (41BL3) recovered "a bead made of the columella of a conch shell" from Burial 0-7, and a marine shell "gorget" was found with another burial (Jackson 1933:2, 21, 33). A pendant fragment found at 41CV1007 was identified as a marine whelk (*Busycon* sp.) by Mariah Associates, Inc. (Abbott and Trierweiler ed. 1995:511). These finds on Fort Hood, along with the conch shell columella bead from 41BL488-A (see Chapters 5 and 6), add to the growing list of central Texas sites where marine shell artifacts have been found.

Based on his work at Allens Creek in south Texas, Hall (1981:Table 8 and Figure 49) looked at the distribution of marine shell artifacts in an 80-county area encompassing central Texas and the Texas Gulf Coast. Additional information from Choke Canyon Reservoir and other south Texas sites was compiled by Highley (1986:Table 8), and the regional data were then updated through ca. 1995 by Dreiss (1995) after work at the Loma Sandia site (see Taylor and Highley 1995). Most recently, a synthesis of hunter-gatherer mortuary practices in southern Texas by Perttula (2001:Figure 14, Table 19) summarizes information on marine shell artifacts found in association with burials throughout the Rio Grande and central coastal plains. Table 7.5 presents another updated listing of central and south Texas sites where marine shell ornaments have been recovered. This listing compiles data primarily derived from the four sources mentioned above with that from several more localities, including some central Texas sites. It does not represent an exhaustive literature search but rather an attempt to identify additional sites where marine shell artifacts have been found, especially those sites in central Texas.

Using the data in Table 7.5, the distribution of marine shell artifacts in central and south Texas is revealing (Figure 7.2). Although there is an obvious concentration of sites with marine shell artifacts along the coast, utilitarian items—

Table 7.5. Summary of central and south Texas sites where marine shell artifacts have been found

County	No. of Sites	Site No.	Site Name or Location	Reference*
Aransas	4	41AS1	Bert Johnson	Campbell 1947; Dreiss 1995; Hall 1981
		41AS2	Kent-Crane (or Live Oak Point)	Campbell 1952; Dreiss 1995; Hall 1981
		41AS16	Swan Lake	Dreiss 1995; Prewitt et al. 1987
		41AS80	Palm Harbor	Mokrey 1986; Mokrey and Fitzpatrick 1980
Austin	5	41AU1	Goebel	Dreiss 1995; Duke 1981, 1982a, 1982b; Fleming and Fleming 1959; Hall 1981
		41AU36	Ernest Witte	Dreiss 1995; Hall 1981:entire report
		41AU37	Leonard K	Dreiss 1995; Hall 1981:213
		41AU38	Little Bethlehem	Hall 1981:213–214
		41AU55	Brandes	Dreiss 1995; Highley et al. 1988
Bell	4	41BL3	Willison Farm (or Owl Creek)	Dreiss 1995; Hall 1981; Jackson 1933b
		41BL113	Wendland	Dreiss 1995; Hall 1981
		41BL116	Bomer	Andy Malof, personal communication 2001
		41BL488-A	unnamed, Fort Hood	this report
Bexar	9	41BX1	Olmos Dam	Dreiss 1995; Hall 1995:51; Lukowski 1988
		41BX300	unspecified	Highley 1986
		41BX323	unnamed site in Brackenridge Park, San Antonio	Houk et al. 1999:129
		41BX502	unnamed, San Geronimo Creek	Dreiss 1995
		41BX528	unnamed, San Geronimo Creek	Dreiss 1995
		none	unnamed, Cibola Creek	Perttula 2001; Vereen 1993
		none	Granberg	Perttula 2001; Schuetz 1966
		none	unnamed, San Antonio area, single find	Dreiss 1995; Greer 1977
		none	unnamed, Southwest Bexar County	Dreiss 1995; McReynolds 1982
Bosque	2	41BQ20	Brawley's Cave	Dreiss 1995; Hall 1981; Olds 1965
		41BQ46	Horn Shelter 2	Redder 1985:43–47
Brazoria	2	41BO35	Dow Cleaver	Dreiss 1995; Hollingsworth 1981
		41BO76	Shell Point	Dreiss 1995; Hole and Wilkenson 1973

Table 7.5, continued

County	No. of Sites	Site No.	Site Name or Location	Reference*
Brooks	1	none	unspecified	Highley 1986
Calhoun	4	41CL21	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
		41CL24	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
		41CL31	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
		41CL33	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
Cameron	2	41CF2	Floyd Morris	Huebner and Comuzzie 1992; Collins et al. 1969
		41CF29	–	Perttula 2001
Chambers	1	41CH13	Mayes Marsh	Dreiss 1995
Comal	1	41CM25	Locke Farm	Dreiss 1995; Hall 1981; Woolsey 1936
Coryell	1	41CV1007	unnamed, Fort Hood	Abbott and Trierweiler ed. 1995a:498–513
DeWitt	2	41DW234	Patt Dunn	Dreiss 1995; Hudgeons and Hester 1977
		none	unspecified, eastern DeWitt County	Highley 1986
Dimmitt	2	41DM30	–	Dreiss 1995; Hester 1970
		none	Hines Ranch Site	Dreiss 1995; Hester 1970
Duval	1	none	unknown	Highley 1986
Fort Bend	3	41FB2	Big Creek	Dreiss 1995; Hall 1995:52
		41FB3	Bowser Farm	Dreiss 1995; Hall 1981
		41FB13	Albert George	Dreiss 1995; Hall 1981; Walley 1955
Galveston	2	41GV1	Caplen	Campbell 1957; Dreiss 1995; Hall 1995:53
		41GV5	Jamaica Beach	Aten et al. 1976; Hall 1995:53; Ring 1963
Goliad	1	41GD4	unnamed	Highley 1986
Harris	2	41HR61	Galena Shell Midden	Dreiss 1995; Hall 1981
		41HR80	Harris County Boys School	Aten et al. 1976; Dreiss 1995; Hall 1995:53
Hidalgo	4	41HG1	Ayala	Campbell and Frizzell 1949; Hester and Ruecking 1940; Huebner and Commuzzie 1992
		41HG27	unnamed, Arroyo Colorado	Hester and Rodgers 1971
		41HG86	unnamed	Day et al. 1981; Dreiss 1995
		41HG173	–	Perttula 2001

Table 7.5, continued

County	No. of Sites	Site No.	Site Name or Location	Reference*
Jackson	1	41JK7	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975
Jim Wells	2	41JW8	unnamed	Highley 1986
		41JW9	–	Perttula 2001
Kerr	1	41KR241	Bering Sinkhole	Bement 1994; Perttula 2001
Live Oak	12	41LK8	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41LK14	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41LK20	unnamed, Choke Canyon Reservoir	Hall et al. 1982, 1986; Highley 1986
		41LK28	Loma Sandia	Dreiss 1995; Hall 1995; Taylor and Highley 1995
		41LK31/32	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41LK51	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41LK67	unnamed, Choke Canyon Reservoir	Brown et al. 1982; Dreiss 1995; Highley 1986:76
		41LK75	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41LK85	unnamed	Hall et al. 1982, 1986; Highley 1986
		41LK87	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41LK250	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		none	Herring	Highley 1986
Llano	1	41LL4	Fall Creek	Dreiss 1995; Hall 1981; Jackson and Woosley 1938
Matagorda	1	41MG23	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
Medina	2	41ME42	unnamed, San Geronimo Creek	Dreiss 1995
		41ME43	unnamed, San Geronimo Creek	Dreiss 1995
McLennan	1	41ML46	Asa Warner	Watt 1956; Wright 1997
McMullen	3	41MC55	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		41MC296	unnamed, Choke Canyon Reservoir	Dreiss 1995; Hall et al. 1982, 1986; Highley 1986:76
		none	unspecified, Bromley F. Cooper collection, CAR-UTSA	Highley 1986
Milam	1	41MM19	–	Perttula 2001

Table 7.5, continued

County	No. of Sites	Site No.	Site Name or Location	Reference*
Nueces	18	41NU2	Oso (or Callo del Oso)	Dreiss 1995; Jackson 1933a; Martin 1930
		41NU15	unnamed	Dreiss 1995; Hall 1981
		41NU17	Oso Creek	Dreiss 1995; Hall 1981
		41NU18	unnamed	Dreiss 1995; Hall 1981
		41NU26	unnamed	Dreiss 1995; Hall 1981
		41NU27	Starry Dune	Dreiss 1995; Hall 1981
		41NU29	Rodd Field	Dreiss 1995; Hall 1981
		41NU30	unnamed	Dreiss 1995; Hall 1981
		41NU32	unnamed	Dreiss 1995; Hall 1981
		41NU38	unnamed	Dreiss 1995; Hall 1981
		41NU39	unnamed	Dreiss 1995; Hall 1981
		41NU40	unnamed	Dreiss 1995; Hall 1981
		41NU45	unnamed	Dreiss 1995; Hall 1981
		41NU46	Tucker	Dreiss 1995; Hall 1981
		41NU65	unnamed	Dreiss 1995:543; Steele and Mokry 1985
		41NU66	Bauman	TARL site fiiles
		41NU148	unnamed	Dreiss 1995; Hall 1981
		41NU173	Berryman	Hall 1995:49; Mokry 1979
San Patricio	4	41SP4	unnamed	Dreiss 1995; Hall 1981
		41SP43	Ingleside Cove	Dreiss 1995; Hall 1981; Story 1968
		41SP64	unnamed, Redfish Bay	Hester and Corbin 1975; Huebner and Commuzzie 1992:15
		41SP78	unnamed, Redfish Bay	Hester and Corbin 1975; Huebner and Commuzzie 1992:15
Starr	3	41SR136	unnamed	Highley 1986
		41SR251	unnamed	Highley 1986
		none	unspecified	Dreiss 1995; Weir 1956

Table 7.5, continued

County	No. of Sites	Site No.	Site Name or Location	Reference*
Travis	3	41TV29	Wiley Williams	Dreiss 1995; Hall 1981
		41TV88	Pat Parker	Dreiss 1995; Greer and Benfer 1975; Hall 1981
		none	"Site 6" in Marshall Ford Basin, Lake Travis	McLaurin 1938:125
Uvalde	1	41UV60	Anthon	Highley 1986; Weir and Doran 1980
Victoria	7	41VT1	Morhiss	Calhoun 1965; Campbell 1956, 1976; Dreiss 1995; Hall 1981
		41VT9	–	Perttula 2001
		41VT15	Johnston	Dreiss 1995; Hall 1981
		41VT29	unnamed	Dreiss 1995; Hall 1981
		41VT31	unnamed	Dreiss 1995; Hall 1981
		41VT34	Bird Point Hill	Dreiss 1995; Hall 1981
		41VT94	Blue Bayou	Huebner and Commuzzie 1992
Webb	2	41WB20	unspecified, private collection	Dreiss 1995; Hester 1970
		41WB557	Boiler Site	Quigg et al. 2002
Wharton	3	41WH14	Peikert	Dreiss 1995; Kindall 1980
		41WH39	Crestmont	Dreiss 1995; Hall 1995:51–52; Vernon 1988
		41WH44	–	Perttula 2001
Willacy	4	41WY51	unnamed	Day et al. 1981; Dreiss 1995
		41WY59	unnamed	Day et al. 1981; Dreiss 1995
		41WY60	unnamed	Day et al. 1981; Dreiss 1995
		41WY77	unnamed	Day et al. 1981; Dreiss 1995
Williamson	2	41WM230	Loeve-Fox	Prewitt 1974; Prewitt 1982
		41WM235	Wilson-Leonard	Collins 1998:729–730
Zavala	1	41ZV14	Holdsworth Ranch	Dreiss 1995; Hester 1970
Zapata	2	41ZP7	–	Perttula 2001
		41ZP85	–	Perttula 2001
Total	127			

Note: Artifacts include all modified specimens. They may be modified as ornaments, as tools, or as waste by-products of making ornaments and tools.
* Dreiss (1995) refers to Table 65 and Figure 315 unless otherwise specified. Hall (1981) referes to Table 8 and Figure 49. Hall (1991) refers to Figure 15 unless otherwise specified. Highly (1986) refers to Table 8 unless otherwise specified. Perttula (2001) refers to Table 19 unless otherwise specified.

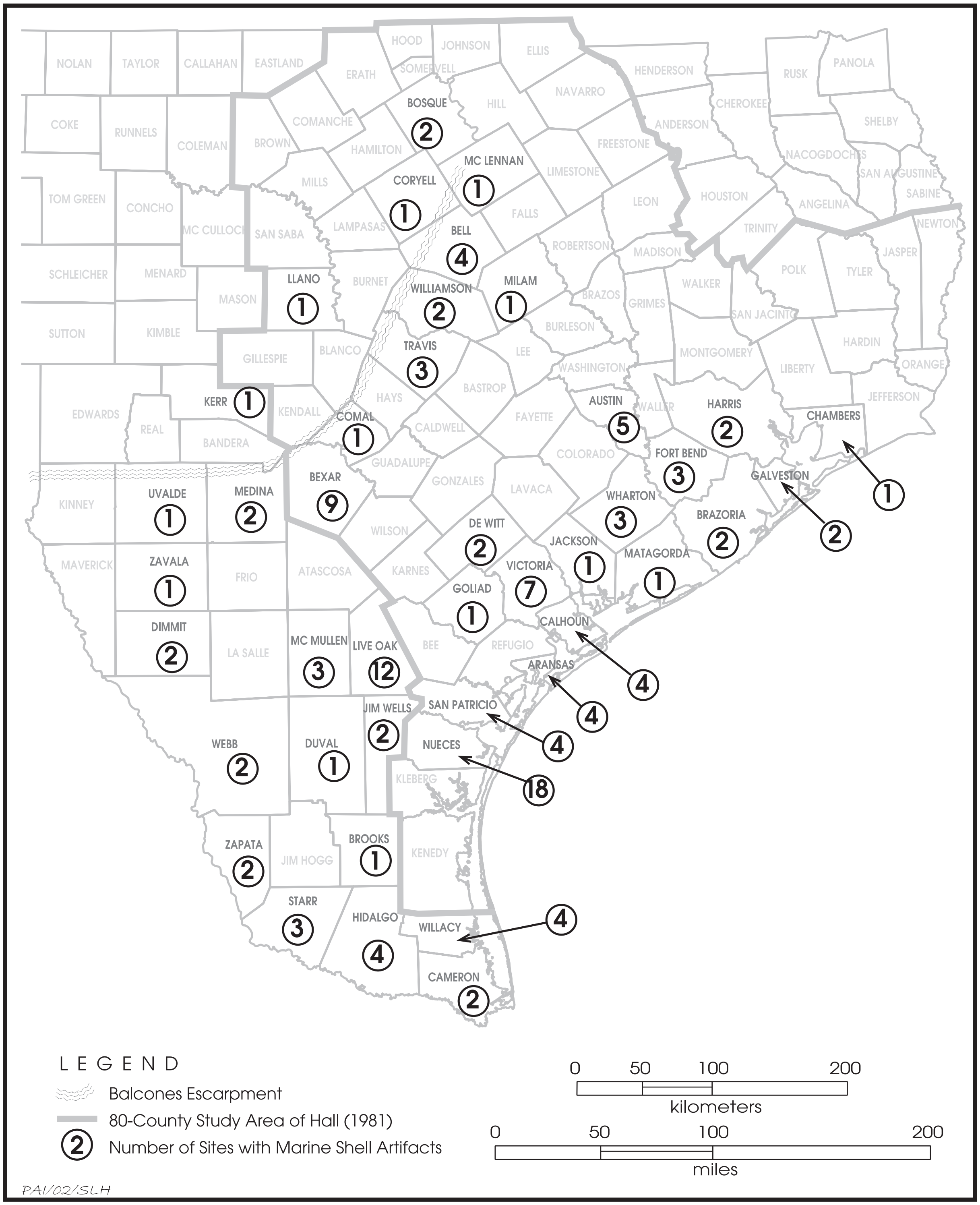

Figure 7.2. Map showing the distribution of central and south Texas archeological sites where marine shell artifacts have been found.

Table 7.5. Summary of central and south Texas sites where marine shell artifacts have been found

County	No. of Sites	Site No.	Site Name or Location	Reference*
Aransas	4	41AS1	Bert Johnson	Campbell 1947; Dreiss 1995; Hall 1981
		41AS2	Kent-Crane (or Live Oak Point)	Campbell 1952; Dreiss 1995; Hall 1981
		41AS16	Swan Lake	Dreiss 1995; Prewitt et al. 1987
		41AS80	Palm Harbor	Mokrey 1986; Mokrey and Fitzpatrick 1980
Austin	5	41AU1	Goebel	Dreiss 1995; Duke 1981, 1982a, 1982b; Fleming and Fleming 1959; Hall 1981
		41AU36	Ernest Witte	Dreiss 1995; Hall 1981:entire report
		41AU37	Leonard K	Dreiss 1995; Hall 1981:213
		41AU38	Little Bethlehem	Hall 1981:213–214
		41AU55	Brandes	Dreiss 1995; Highley et al. 1988
Bell	4	41BL3	Willison Farm (or Owl Creek)	Dreiss 1995; Hall 1981; Jackson 1933b
		41BL113	Wendland	Dreiss 1995; Hall 1981
		41BL116	Bomer	Andy Malof, personal communication 2001
		41BL488-A	unnamed, Fort Hood	this report
Bexar	9	41BX1	Olmos Dam	Dreiss 1995; Hall 1995:51; Lukowski 1988
		41BX300	unspecified	Highley 1986
		41BX323	unnamed site in Brackenridge Park, San Antonio	Houk et al. 1999:129
		41BX502	unnamed, San Geronimo Creek	Dreiss 1995
		41BX528	unnamed, San Geronimo Creek	Dreiss 1995
		none	unnamed, Cibola Creek	Perttula 2001; Vereen 1993
		none	Granberg	Perttula 2001; Schuetz 1966
		none	unnamed, San Antonio area, single find	Dreiss 1995; Greer 1977
		none	unnamed, Southwest Bexar County	Dreiss 1995; McReynolds 1982
Bosque	2	41BQ20	Brawley's Cave	Dreiss 1995; Hall 1981; Olds 1965
		41BQ46	Horn Shelter 2	Redder 1985:43–47
Brazoria	2	41BO35	Dow Cleaver	Dreiss 1995; Hollingsworth 1981
		41BO76	Shell Point	Dreiss 1995; Hole and Wilkenson 1973
Brooks	1	none	unspecified	Highley 1986
Calhoun	4	41CL21	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
		41CL24	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
		41CL31	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
		41CL33	unnamed, Matagorda Bay study	Dreiss 1995; Fritz 1975; Hall 1981
Cameron	2	41CF2	Floyd Morris	Huebner and Comuzzie 1992; Collins et al. 1969
		41CF29	–	Perttula 2001
Chambers	1	41CH13	Mayes Marsh	Dreiss 1995
Comal	1	41CM25	Locke Farm	Dreiss 1995; Hall 1981; Woolsey 1936

Table 7.6. Summary of marine shell artifacts found in central Texas sites

County	Site Number	Site Name or Location	No. of Artifacts Found	Description of Artifacts* and Context	Site Type	No. of Reported Burials	No. of Artifacts Associated with Burials	References
Bell	41BL3	Willison Farm (or Owl Hollow)	2	A conch columella bead and a conch gorget; both are from human burials. Age unknown, but probably Late Archaic.	Rockshelter-cemetery	11 (24 people)	2	Jackson 1933b
	41BL113	Wendland	1+	Unspecified artifacts from unknown contexts. Extensively potted site in the city of Temple. Newspaper reports finding of burials by local collectors.	Open campsite-cemetery	unknown	?	Hall 1981
	41BL116	Bomer	1	One small marine gastropod (bead?) from Late Archaic zone.	Open campsite	–	–	Andy Malof, personal communication, 2002
	41BL488-A	unnamed, Fort Hood	1	A conch columella bead found in Late Archaic to Late Prehistoric deposits.	Rockshelter	–	–	this report
Bexar	41BX1	Olmos Dam	12	Seven conch (*Busycon contrarium*) pendants, 1 shell fragment, and 4 conch columella pendants. Ten of the 11 pendants are from burials. All are thought to date from 1680 B.C. to A.D. 260 (Late Archaic).	Cemetery	13	10	Hall 1995:51; Lukowski 1988:Figures 29–31
	41BX300	–	1	One *olivella* bead.	unknown	–	–	Highley 1986:Table 8
	41BX323	unnamed site in Brackenridge Park, San Antonio	1	A polished fragment of a marine gastropod. Appears to be associated with a Late Prehistoric occupation.	Open campsite	–	–	Houk et al. 1999:129, Figure 8.17
	41BX502	unnamed, San Geronimo Creek	2	A triangular conch pendant and a T-shaped conch pendant. Age unknown.	unspecified	–	–	Chandler 1991:Figure 3
	41BX528	unnamed, San Geronimo Creek	1	A modified conch shell (*Busycon contrarium*) with cut marks from removing sections of the shell. Age unknown.	unspecified	–	–	Chandler 1991:Figure 2
	–	unnamed, Cibola Creek	1	A conch whorl pendant from a burial in a midden. Possibly Late Archaic.	Open campsite/midden	1	1	Vereen 1993: Figure 2
	–	Granberg	1	A “clam shell gorget” from disturbed burials.	Midden-cemetery	8	1	Schuetz 1966: Plate 3
	–	unnamed, San Antonio area, single find	1	A conch columella bead found in a plowed field. Age unknown.	Open campsite	–	–	Greer 1977

Table 7.6, continued

County	Site Number	Site Name or Location	No. of Artifacts Found	Description of Artifacts* and Context	Site Type	No. of Reported Burials	No. of Artifacts Associated with Burials	References
	–	unnamed, Southwest Bexar County	1	A conch columella bead and a conch pendant found in a plowed field. Age unknown.	Open campsite (possible burned rock midden)	–	–	McReynolds 1982
Bosque	41BQ20	Brawley's Cave	1	A conch columella pendant found during a 1917–1918 excavation. Precise context is uncertain but the pendant may have been from a burial. Age unknown, probably Late Archaic.	Rockshelter-cemetery	6	?	Hall 1981; Olds 1965: Figure 10; Simmons 1965
	41BQ46	Horn Shelter 2	82	Associated with a Paleoindian-age double burial were "eighty beads made from a small seashell, *Neritina canines*." Inside in or around the skull another "small seashell bead," and "a large olivia shell bead" (*Oliva litterata*) were found.	Rockshelter-cemetery	2	82	Redder 1985: Figure 4
Comal	41CM25	Locke Farm	2+	"…shell pendants and columella beads in association with human burials." Age unknown.	Cemetery	19	2+	Hall 1981: Table II-20; Hall 1995
Coryell	41CV1007	unnamed, Fort Hood	1	A whelk shell (*Busycon* sp.) pendant fragment with orange resinous stains. It came from burned rock midden deposits of Late Archaic to Late Prehistoric age.	Burned rock midden	–	–	Abbott and Trierweiler eds. 1995a: 498–513
	41KR241	Bering Sinkhole	19	Two marine shell pendants (*Busycon* sp.) and 17 small beads (16 of *Olivella dealbata* and 1 of *Olivella minuta*) found in association with burials in a sinkhole cemetery. The pendants are from Early Archaic deposits and were associated with Martindale and Uvalde points while the beads are from Late Archaic deposits and were associated with a Bulverde point.	Vertical shaft sinkhole cemetery	62	unknown	Bement 1994
Llano	41LL4	Fall Creek, Site 3	4	Three *Oliva litterata* beads or pendants from Mound No. 2. Age unknown, but all are likely from Late Archaic to Late Prehistoric deposits. A conch (*Fulgar perversum*) columella bead from Rock Shelter No. 3. Age unknown, but probably Late Prehistoric.	3 Rockshelters, 3 Burned rock mounds, and 3 Middens/ open campsites	3	–	Hall 1981; Jackson and Woosley 1938: 23–24, 102, Plate XIX (specimens 1-1 to 1-4)

Table 7.6, continued

County	Site Number	Site Name or Location	No. of Artifacts Found	Description of Artifacts* and Context	Site Type	No. of Reported Burials	No. of Artifacts Associated with Burials	References
Medina	41ME42	unnamed, San Geronimo Creek	1	A conch columella bead from disturbed burned rock midden deposits. Age unknown.	Burned rock midden	–	–	Chandler 1991:Figure 3
	41ME43	unnamed, San Geronimo Creek	1	A conch columella bead from disturbed burned rock midden deposits. Age unknown.	Burned rock midden	–	–	Chandler 1991:Figure 3
McLennan	41ML46	Asa Warner	1	A pendant made of a "large sea shell." Age unknown.	Open campsite	7+	–	Watt 1956:23, Figure 6-5
Travis	41TV29	Wiley Williams	1	A conch columella bead. Age unknown.	Open campsite	–	–	Hall 1981
	41TV88	Pat Parker	1	A ridged bivalve mollusc pendant found in a burial. Probably Austin phase, Late Prehistoric.	Cemetery	17–20	1	Hall 1981; Greer and Benfer 1975
	–	"Site 6" in Marshall Ford Basin, Lake Travis	2	One gorget made of columnar section of conch shell identified as *Fulgar perversus* and one small shell with a drilled hole. Both are from burned rock midden deposits of unknown age.	Burned rock midden	–	–	McLaurin 1938:125
	41UV60	Anthon site	2	"Two marine shell fragments" from unspecified contexts.	Open campsite	–	–	Highley 1986:Table 8; Weir and Doran 1980
Williamson	41WM230	Loeve-Fox	4	Two conch or whelk shell pendants and two conch or whelk shell fragments, possibly debris from manufacture of ornaments. One conch shell pendant is associated with a burial. All artifacts are presumably Austin phase, Late Prehistoric.	Open campsite-cemetery	27	1	Hall 1995; Prewitt 1982: 98–99
	41WM235	Wilson-Leonard	6	Six small gastropod beads: 5 are Early Archaic (4 are *Prunum apicina* and 1 is *Neritina* sp.); 1 is late Paleoindian (*Prunum apicina*).	Open campsite	1	–	Collins 1998: 729–730, Figure 21–3

* Dreiss (1995:542) states that the genus *Busycon* is valid for most archeological specimens so identified, but that the species *B. contrarium* is extinct and does not resemble any of the archeological specimens. The specimens from Loma Sandia, for example, are all identified as *Busycon* (*Sinistrofulgar*) *perversum pulleyi*, a conch commonly referred to as the lightning whelk. Both common names—conch and whelk—are common in the archeological literature. Andrews (1991:146–147) illustrates two species of *Busycon*.

Perttula 2001), but these prehistoric interactions remain poorly understood. We have yet to identify all of the perishable items that may have been pivotal in such interactions, but some progress has been made. Hall (1998, 2000), for example, suggests that fish, prickly pear tunas, pecans, and other abundant food resources may have been important in influencing settlement, movement, and interaction of prehistoric human populations. As the principal nonperishable material denoting widespread coastal influence, marine shells are pivotal to any serious studies of prehistoric settlement patterns, group interactions, or exchange networks in Texas.

Future studies should continue to examine the geographic and temporal distributions of marine shell artifacts but also focus on precisely identifying and sourcing the different species of marine shell found in archeological contexts. Previous studies by Claassen and Sigmann (1993) demonstrate that it is possible to identify different Gulf Coast source areas for marine shells (specifically *Busycon* sp.) using atomic-absorption spectroscopy. This is possible because the shells absorb chemicals from their host waters, and significant differences in seawater chemistry occur across broad areas. This technique uses chemical trace elements to identify the source area signatures, much like the methods successfully used for years to determine the sources of obsidian artifacts. In their control sample, six shells from the Texas coast have a distinctive geochemistry that is different from that of shells in the central and eastern gulf coasts (Claassen and Sigmann 1993:342). This technique has considerable potential to provide meaningful data for interpreting movements of marine shell artifacts in Texas.

Late Holocene Paleosols

The paleosols found at 41BL991-B and 41CV580 may be compared with buried paleosols in at least four other sites and three geomorphic locations on Fort Hood (Figure 7.3). Coupling the radiocarbon data from 41BL991-B and 41CV580 with chronological evidence from other places with similar buried paleosols provides a good estimate of the age of the deposition of the sediments (Table 7.7; Figure 7.4), from which the age of the soil formation episode may be inferred. Nordt (1995) and Kibler (in Mehalchick et al. 1999:213–221) recognized the Tanktrail and Leon River paleosols as a widespread phenomenon. Deposition of the West Range alluvium started as early as 2350 B.C. (4300 B.P.) and ended sometime around A.D. 1150 to 1350 (800 to 600 B.P.) according to Nordt (1992:66). Sedimentation rates appear to have slowed considerably between A.D. 450 and 950 (1500 and 1000), and prehistoric peoples occupied the stable alluvial terraces as these soils were forming. As shown in Figure 7.3, the chronological evidence suggests that the Tanktrail and Leon River paleosols are essentially contemporaneous, and the principal period of cumulic soil formation that resulted in these paleosols appears to have been from ca. A.D. 950 to 1350 B.P. (1000 to 600 B.P.).

As summarized in Table 7.7, the chronological evidence for cultural occupations buried in the Leon River and Tanktrail paleosols appears to represent two major periods of repeated occupations during the late Holocene, one from ca. 377 B.C. to A.D 380 and another from A.D. 603 to 1393. The data show a short span from A.D. 380 to 603, near the end of the Late Archaic period, that is not represented in the archeological evidence. This gap probably does not represent a real cultural event (i.e., a period of limited human occupation), but more likely reflects limited archeological sampling or peculiarities inherent in radiocarbon calibration methods.

The combined cultural and geomorphic evidence indicates intensive use of selected alluvial terraces during a long period of widespread landscape stability during the late Holocene. In addition to the paleosols observed on Fort Hood, a contemporaneous cultural-bearing paleosol has been identified by Henry et al. (1980) in the Hog Creek watershed situated about 30 km north of Fort Hood. Hog Creek is a tributary to the Bosque River, and the presence of this paleosol suggests that this geomorphic phenomenon—a period of landscape stability and paleosol formation—is widespread in central Texas.

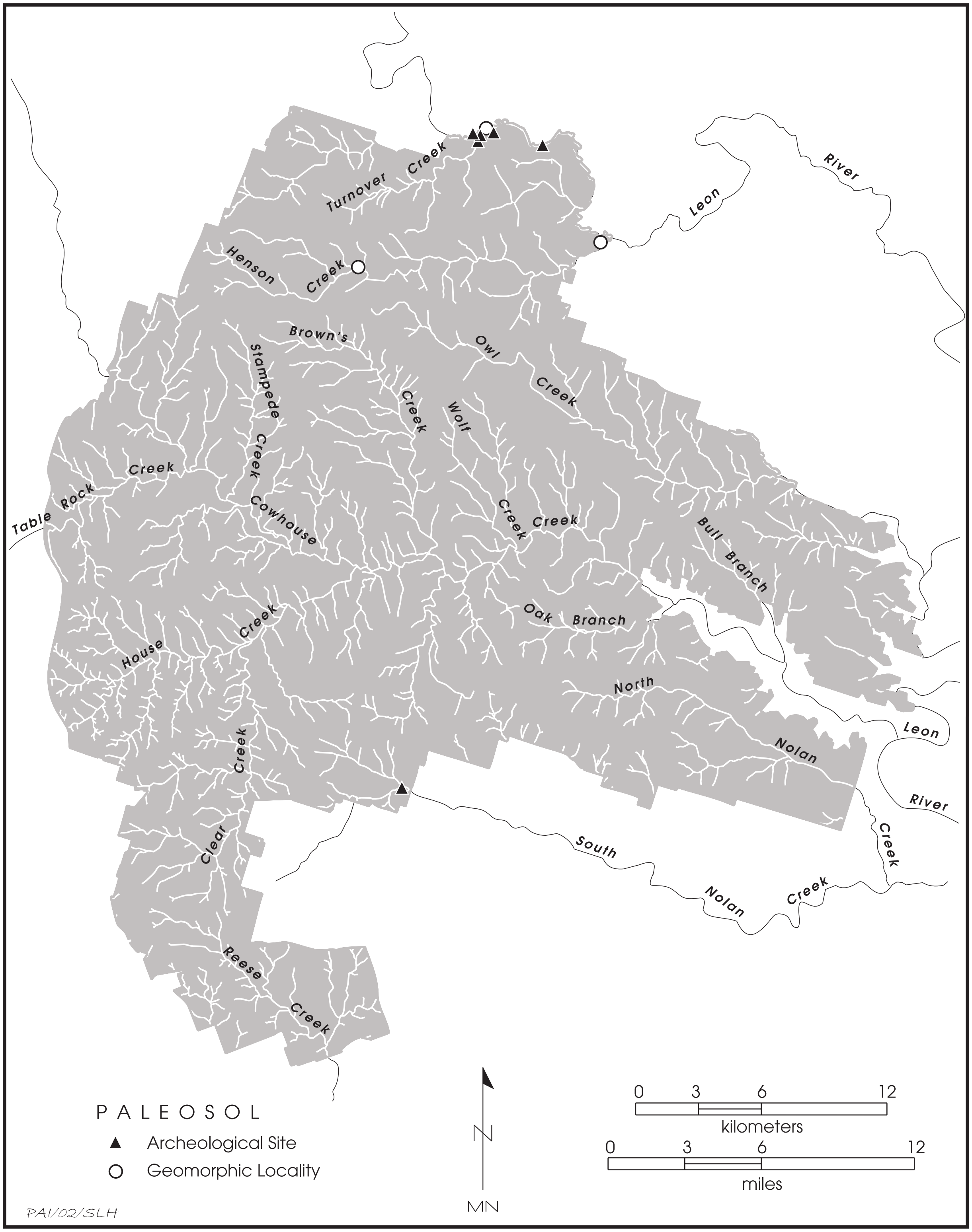

Figure 7.3. Archeological sites and geomorphic localities where late Holocene Leon River and Tanktrail paleosols are identified.

Table 7.7. Summary of open campsites and radiocarbon dates associated with buried late Holocene paleosols on Fort Hood

Site and Subarea*	Drainage	Named Paleosol	Dated Material	Context	Corrected Age, B.P.	Calibrated Calendrical Date (2-sigma range)**	Reference
ARCHEOLOGICAL LOCALITIES							
41BL991-B	South Nolan Creek	cf. Tanktrail paleosol	charcoal	from Feature 1 buried in 2Ab horizon (see Backhoe Trench 22)	1060 ° 70	A.D. 781–1158	this report
		cf. Tanktrail paleosol	charcoal	from Feature 2 buried in 2Ab horizon (see Backhoe Trench 24)	1200 ° 50	A.D. 690–963	this report
		cf. Tanktrail paleosol	charcoal	from Feature 3 buried in 2Abt horizon (see Backhoe Trench 23)	1100 ° 40	A.D. 783–1020	this report
		cf. Tanktrail paleosol	charcoal	from Feature 4 buried in 2Ab horizon (see Backhoe Trench 22)	880 ° 40	A.D. 1036–1244	this report
		cf. Tanktrail paleosol	charcoal	from nonfeature context buried in 2Ab horizon (see Backhoe Trench 22)	690 ° 40	A.D. 1262–1393	this report
41CV580	Leon River	above Leon River paleosol	charcoal	from nonfeature context buried in A horizon of Ford Alluvium just above the paleosol (2Ab horizon; see Test Unit 3)	630 ° 40	A.D. 1292–1401	this report
		Leon River paleosol	charcoal	from Feature 23 buried in 2Ab horizon (see Test Unit 3)	1080 ° 40	A.D. 891–1020	this report
		Leon River paleosol	charcoal	from nonfeature context buried in 2Bb horizon (see Test Unit 3)	1770 ° 40	A.D. 134–380	this report
41CV1478	Leon River	above Leon River paleosol	charcoal	from nonfeature context buried in Ford Alluvium 3C horizon above buried paleosol (4Ab horizon; see Backhoe Trench 1)	780 ° 70	A.D. 1041–1387	Mehalchick et al. 1999:119–122; 213–215, 268
		Leon River paleosol	charcoal	from Feature 1 buried in paleosol horizon (see Test Unit 3)	1830 ° 60	A.D. 34–376	Mehalchick et al. 1999:119–122; 213–215, 268
41CV1479	Leon River	Leon River paleosol	charcoal	from Feature 1 buried in paleosol horizon (see Test Unit 1)	870 ° 60	A.D. 1032–1264	Mehalchick et al. 1999:122–130; 213–215, 268
		Leon River paleosol	charcoal	Nonfeature context buried in paleosol horizon (see Test Unit 1)	940 ° 60	A.D. 996–1219	Mehalchick et al. 1999:122–130; 213–215, 268

Table 7.7, continued

Site and Subarea*	Drainage	Named Paleosol	Dated Material	Context	Corrected Age, B.P.	Calibrated Calendrical Date (2-sigma range)**	Reference
41CV1480	Leon River	above Leon River paleosol	charcoal	Feature 1 buried in Ford Alluvium above paleosol (see Test Unit 1)	420 ° 70	A.D. 1407–1638	Mehalchick et al. 1999:130–134; 213–215, 268
41CV1482	Leon River	Leon River paleosol	charcoal	Feature 1 buried in 2Ab paleosol horizon (see Test Unit 1 and Backhoe Trench 1)	1060 ° 60	A.D. 782–1156	Mehalchick et al. 1999:134–145; 213–215
		Leon River paleosol	charcoal	Feature 3 buried in 2Bwb paleosol horizon (see Test Unit 1 and Backhoe Trench 1)	1880 ° 70	39 B.C.–A.D. 323	Mehalchick et al. 1999:134–145; 213–215
		Leon River paleosol	charcoal	Feature 4 buried in 2Bwb paleosol horizon (see Test Unit 2 and Backhoe Trench 4)	2140 ° 70	377–1 B.C.	Mehalchick et al. 1999:134–145; 213–215
GEOMORPHIC LOCALITIES (NONSITE)							
Henson CB 4	Henson Creek	above Tanktrail paleosol	charcoal	from hearth buried in Ford Alluvium (Bw horizon) inset into West Range at CB 4 locality	420 ° 70	A.D. 1407–1638	Nordt 1992:45, 119–120, 173, Figure 17; 1995:208, 211
Henson CB 6	Henson Creek	Tanktrail paleosol	charcoal	from hearth buried in paleosol (BCb horizon) at CB 6 locality	1300 ° 80	A.D. 603–939	Nordt 1992:45, 120, 173, Figure 17; 1995:208, 211
Turnover CB 1 (near 41CV1478)	Turnover Creek at Leon River	Leon River paleosol	bulk soil humate	from hearth buried in paleosol (Ab2 horizon) at CB 1 locality	1010 ° 70	A.D. 891–1206	Nordt 1992:130, 173, Figures 25, 26 and 27
		Leon River paleosol	charcoal	from hearth buried in paleosol at CB 1 locality; slump sediments probably from lower portion of Ab2 horizon	1936 ° 51	43 B.C.–A.D. 215	Nordt 1992:130, 173, Figures 25, 26 and 27

Note: Radiocarbon dates are associated with cultural occupations in paleosols. Three radiocarbon dates on snails from 41CV1482 are excluded (see Mehalchick et al. 1999:269–271).

* All sites are eligible for listing in the National Register of Historic Places.

** Radiocarbon age calibrations done using the online CALIB program (HTML version 4.3) of M. Stuiver, P. J. Reimer, and R. Reimer at www.calib.org (executed at the University of Washington).

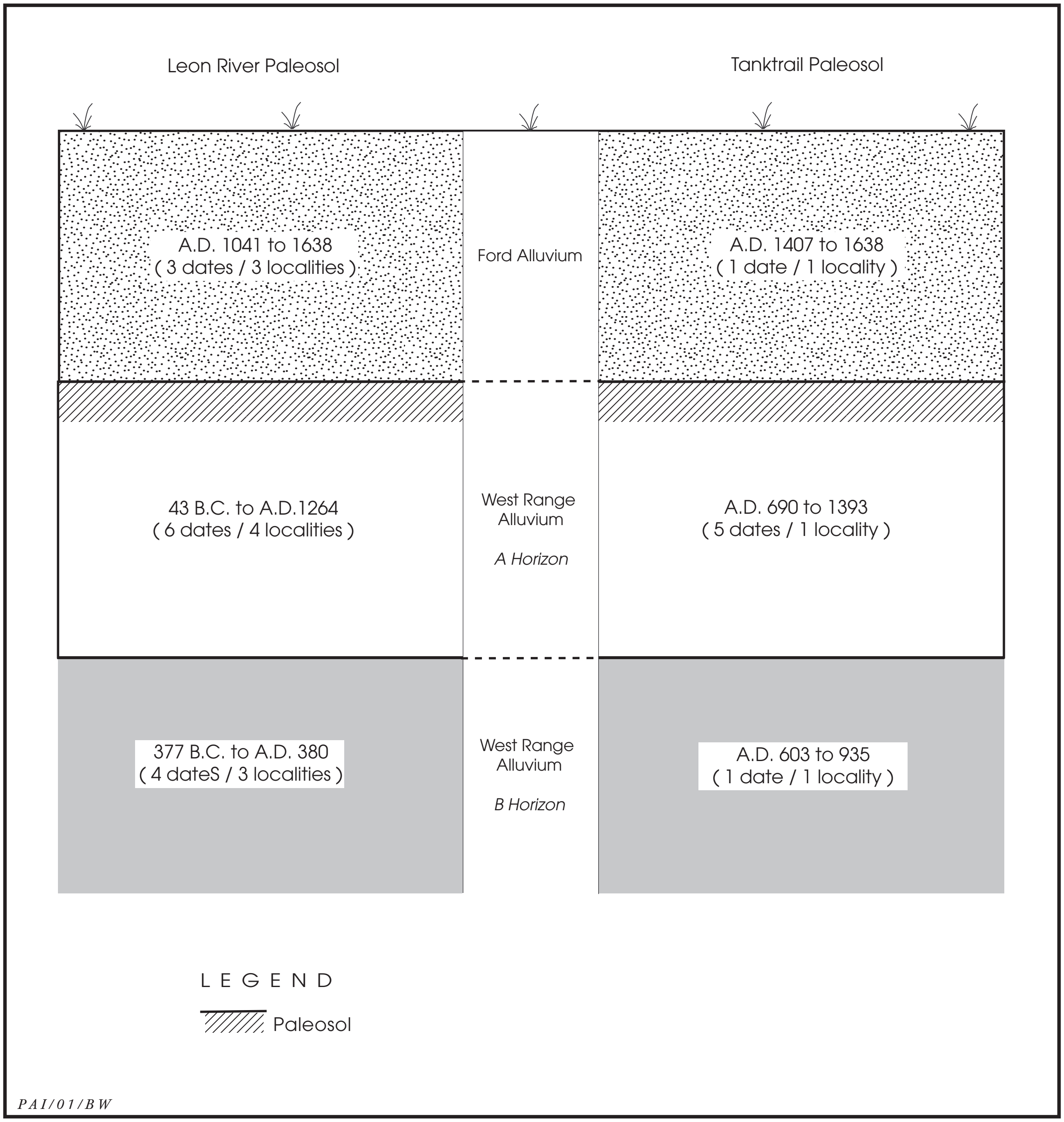

Figure 7.4. Comparison of chronological data for the Leon River and Tanktrail paleosols on Fort Hood.

NATIONAL REGISTER EVALUATIONS AND MANAGEMENT RECOMMENDATIONS

Douglas K. Boyd and Gemma Mehalchick

8

In this chapter, the 19 sites tested during the 2000–2001 season are evaluated according to the National Register of Historic Places (NRHP) criteria defined in the Fort Hood research design (Ellis et al. 1994). Recommendations for NRHP eligibility are made for each site. For each NRHP-eligible site, additional recommendations are made for further archeological work if data recovery is determined to be appropriate and necessary.

Recommendations of NRHP eligibility for the 20 tested subareas (at 19 sites) are summarized in Table 8.1. Eleven of the sites or subareas are not recommended as eligible for listing in the NRHP and do not meet the basic data needs defined in the Fort Hood site significance model. Compared to this model, these sites or subareas have fatal contextual flaws. No stratigraphically discrete and intact cultural components could be identified, and these sites are considered to possess limited or no research potential and warrant no further archeological work or management. The other 9 sites or subareas are recommended as eligible for listing in the NRHP. All meet one or more of the four essential criteria required to demonstrate their research potential (see Chapter 2).

Managing the cultural resources on Fort Hood is a balancing act that requires evaluating many varied and complex options for protecting and preserving archeological sites when possible, and salvaging important information through data recovery when sites cannot be protected. As recommended previously, Fort Hood is attempting to:

> Develop and implement a comprehensive, long-term CRM Plan that integrates monitoring and surveillance of NRHP-eligible prehistoric archeological sites; a feasibility study to examine the costs benefits of various types of alternative protection/preservation measures for various types of sites (specifically the three site types most threatened—rockshelters, Paluxy sites, and burned rock middens/open campsites with middens); and a research-oriented archeological excavation program that examines a sample of different types of NRHP-eligible sites (prioritized by severity of threats) to begin making significant contributions to the efforts to reconstruct central Texas prehistory (Boyd et al. 2000:72).

As always, protection is the recommended management policy for each of the nine sites recommended as eligible for listing in the NRHP. Fort Hood should try to protect and preserve these important archeological resources and avoid or prevent any damage to them. No attempt is made to identify all of the possible preservation strategies or recommend specific protection measures for archeological sites on Fort Hood, but a wide range of potential techniques exist. The literature on various cultural resource protection techniques and strategies is voluminous, and the reader is referred to some basic resources, such as Mathewson et al. (1992), Nickens (1991, 1992, 1993), Society for American Archeology (1990), and U.S. Army Corps of Engineers (1992). Developing a comprehensive site protection strategy for Fort Hood—with a diversity of archeological resources across a vast area—is a daunting task, but the Cultural Resource

Table 8.1. Summary of NRHP eligibility recommendations and data needs for evaluations of prehistoric sites

Site	Site Type	Identifiable or Dateable Bones or Shells	Identifiable or Dateable Macrobotanical Remains	Features with Economic or Chronometric Potential	Multiple, Spatially Separated Features	Burned Rock Features	Unique Artifacts, Concentrations, or Features
SITES RECOMMENDED AS ELIGIBLE FOR LISTING IN THE NRHP							
41BL43	Rockshelter	Yes	Yes	No	No	No	Yes
41BL231-D	Open campsite	Yes	Yes	Yes	No	No	No
41BL488-A	Rockshelter	Yes	Yes	No	No	No	Yes
41BL491	Rockshelter	Yes	Yes	No	No	No	No
41BL589-B	Rockshelter	Yes	Yes	Yes	No	Yes	No
41BL991-B	Open campsite	Yes	Yes	Yes	Yes	Yes	No
41CV580	Open campsite/ burned rock midden	Yes	Yes	Yes	Yes	Yes	No
41CV686-A	Burned rock mound	Yes	Yes	Yes	No	Yes	No
41CV1434-B	Open campsite	Yes	Yes	Yes	No	Yes	No
SITES RECOMMENDED AS NOT ELIGIBLE FOR LISTING IN THE NRHP							
41BL142-A	Rockshelter	Yes	No	No	No	No	No
41BL231-B	Rockshelter	Yes	No	No	No	No	No
41BL490	Rockshelter	Yes*	Yes*	No	No	No	Yes*
41BL989-B	Open campsite	No	No	No	No	No	No
41BL993-B	Open campsite	No	No	No	No	No	No
41BL1039-B	Open campsite	No	No	No	No	No	No
41CV70-B	Open campsite	No	No	No	No	No	No
41CV118-B	Open campsite	No	No	No	No	No	No
41CV506-B	Open campsite	No	No	No	No	No	No
41CV669-B	Open campsite	No	No	No	No	No	No
41CV730-B	Open campsite	No	No	No	No	No	No

Note: Data needs as specified by Ellis et al. (1994:187–188). Numbers 1, 2, 3, and 6 are considered essential data needs for determining research potential and National Register significance.

* Data need was satisfied by testing, but looting has destroyed the contextual integrity of all remaining cultural deposits.

Management Program has already taken some steps by initiating site monitoring and surveillance.

Avoidance and protection probably will not always be possible, and data recovery investigations may be warranted for some archeological sites. In most cases, data recovery of prehistoric sites will mean salvaging important data through archeological excavations. For some sites, more testing will be needed to further refine data recovery, but the data available for other sites are sufficient to plan a comprehensive data recovery investigation. In any case, data recovery should be planned and undertaken with full knowledge of, and accounting for, the particular threats to a specific resource. Once the area of potential effect has been adequately defined, data recovery can be planned accordingly. Threats—such as damage related to military development projects—may be real and immediate or may be potential and uncertain (see Boyd et al. [2000] for a detailed discussion of threats to sites on Fort Hood). Potential danger from activities such as ongoing military training involving tracked vehicles and looting by artifact collectors are much more difficult to deal with. It is impossible to know when and where normal military training activities (i.e., those that do not require a dig permit or coordination with the Cultural Resource Management Office) or looting may occur, but these threats are often just as destructive as any formal development project.

Table 8.2 summarizes the threats to each NRHP-eligible site and recommends additional testing and data recovery, if these steps become necessary. The threats to these resources and recommendations are discussed below within four site groups—rockshelters, burned rock mounds, open campsites, and open campsites and burned rock middens. Recommendations presented herein are generic and account for situations in which some or all of the sites in question might be affected. The generalized data recovery proposed for any given site should be conducted within a broad-based research design (e.g., Boyd et al. 2000). These recommendations would need to be revised, however, to account for specific army projects. For any such project, one must take the potential disturbances, or area of potential effect, into account, and a site-specific research design and field strategy should be developed.

ROCKSHELTERS

The threat of damage and destruction to rockshelters on Fort Hood is very real, as the investigations at the seven rockshelters tested in 2000–2001 reveal. The systematic destruction of archeological deposits in rockshelters by looters continues to be the most severe danger to the cultural resources on Fort Hood (see Boyd et al. 2000:49–50). Although other types of sites are imperiled by modern activities such as military training exercises, illegal excavations by looters (e.g., artifact collectors and dealers) cause the greatest amount of destruction to rockshelters. These activities are, as years of systematic observations prove, targeted mainly at burned rock middens and rockshelters, although they also affect other types of sites (e.g., open campsites). Of the seven rockshelters investigated in the 2000–2001 season, looting has disturbed all but one (Table 8.3). Three of the shelter sites are severely damaged or destroyed, with the rockshelter at 41BL490 the worst. This shelter was pristine in 1983, but looters had totally destroyed it by the time it was revisited in 1993. This site probably contained human burials, which looters often target because they contain grave offerings that are valuable on the collectors' market.

Because looting poses the serious threat of destruction, it is recommended that Fort Hood investigate the feasibility and long-term costs of various protection options (such as electronic surveillance and gating) or data recovery investigations for all four of the NRHP-eligible rockshelters reported herein—41BL43, 41BL488-A, 41BL491, and 41BL589-B. If data recovery is deemed appropriate, site-specific recommendations are made below.

Dripline erosion, looting, and bioturbation have severely compromised the integrity of deposits in the west half of the 41BL43 rockshelter. Disturbed sediments in the eastern portion of the site (surface to 20 cm) contain scattered human bones, suggesting that burials are or were present. Below this disturbance, from 20 to 40 cm, a Late Prehistoric (Austin- to Toyah-phase) occupation zone contains dense cultural materials. Although no deeper prehistoric components were encountered, potential is considered high because the maximum thickness of the deposits is almost 140 cm in some areas, two radiocarbon assays on charred

Table 8.2. Potential threats and recommendations for further testing and data recovery at NRHP-eligible sites

						Recommended Data Recovery Effort	
Site	Site Type	Horizontal Extent of Cultural Deposits (m)	Area of Cultural Deposits (m^2)	Maximum Depth of Cultural Deposits (cm)	Threats to Site (ranked by severity)	Additional Testing to Refine Data Recovery Strategy	Volume (m^3) of Hand Excavation for Data Recovery
41BL43	Rockshelter	30.0x4.2	126	40–140	looting	–	105
41BL231-D	Open campsite	48x12	576	60	military activities involving vehicles	–	100
41BL488-A	Rockshelter	56.0x6.6	370	50	looting	–	60
41BL491	Rockshelter	39.5x8.6	340	60	looting	–	110
41BL589-B	Rockshelter	9.3x3.5	33	40	looting	–	15
41BL991-B	Open campsite	150x125	18,750	220+	potential urban/ residential development	8 test units to define deep cultural deposits	300*
41CV580	Open campsite/ burned rock midden	140x55*	7,700	270+	cutbank erosion by Leon River; military activities involving vehicles; looting	5 backhoe trenches and 10 test units to define deep cultural deposits and western extent of site	500*
41CV686-A	Burned rock mound	7.5x6.5	49	20–60	military activities involving vehicles; looting	–	25
41CV1434-B	Open campsite	115x40	4,600	30	military activities involving vehicles	3 backhoe trenches and 2 test units to search for buried components in small isolated terrace insets	60

* A minimum of 100 m^3 per analysis unit.

Table 8.3. Summary of looting evidence in rockshelters

Site	NRHP Recommendation	Degree of Looting Damage	Evidence of Looting
41BL43	Eligible	severe	A 10-m-long looter's trench observed in 1984 destroyed an estimated 3 m^3 of cultural deposits. A modern campfire and additional looter's holes were observed in the talus area in 1993. During current testing, no evidence of recent looting was observed, but human bones (at least two individuals) were found in disturbed deposits. These remains indicate that some burials have been destroyed and others are likely to be present.
41BL142-A	Not eligible	severe	Although apparently pristine when first recorded in 1972, looter's holes were observed in 1987. The site was revisited on 14 September 1992, and no fresh looter's holes were observed. A revisit to the site 16 days later to conduct shovel testing found three fresh excavation holes by looters. No additional evidence of looting was observed during the current testing.
41BL231-B	Not eligible	moderate	This rockshelter was first recorded in 1993; two looter's potholes were documented. A revisit during the current testing documented the same looter's holes, but no new evidence of looting was reported.
41BL488-A	Eligible	moderate	Several looter's excavation holes were noted when the site was first recorded in 1983. Looter's potholes were observed again during a site revisit in 1993, and some were relatively fresh. During the current site revisit, no new evidence of looting was observed.
41BL490	Not eligible	destroyed	No evidence of looting was observed during the initial site recording in 1983. During a 1993 site revisit, researchers observed that intensive looting disturbed 95 percent of the shelter deposits. Current site testing recovered a probable human bone, indicating that burials were once present, and determined that looting had destroyed the shelter. Scattered artifacts in looter's backdirt piles indicate that the shelter could have yielded important information.
41BL491	Eligible	moderate	A possible looter's pothole was observed during the initial site recording in 1983. During the current site testing, one large and several small looter's potholes were recorded and account for at least 1.5 m^3 of destroyed deposits.
41BL589-B	Eligible	none	No evidence of looting was observed during the initial site recording in 1992 or during the 2000 testing.

wood from 37 and 85 cm below the surface are in correct chronological sequence (ca. 350 years apart based on conventional radiocarbon age) and indicate that the stratified deposits are intact, and a line of buried boulders denotes an episode of roof collapse that appears to have sealed in some of the deeper cultural deposits. Data recovery should center around Test Unit 2 in an area of the shelter covering approximately 75 m^2. Comprehensive data recovery would involve manual excavation of approximately 105 m^3 of shelter fill. Also, all disturbed deposits throughout the shelter should be screened to recover human remains.

Site 41BL488-A is the largest of the eligible rockshelters, having maximum dimensions of 56.0 by 6.6 m, including a 25-m-long stretch near the middle of the shelter where a concentration of roof-fall slabs, collapsed from the original overhanging ledge, are found. Ubiquitous cultural materials from the upper 20 cm of shelter deposits reveal occupations from transitional Late Archaic into the Austin phase of the Late Prehistoric period. Two excavations suggest the maximum depth of the deposits is 60 cm, and past and present investigations indicate that looting and animal burrowing have disturbed less than one-fourth of the shelter. Because shell beads (including one made from marine shell) and Scallorn arrow points were recovered and are frequently associated with burials in central Texas rockshelters, it is recommended that all disturbed sediments be screened to recover human remains and possible burial artifacts from the disturbed deposits. Data recovery excavations should concentrate on the areas around the test units, and hand excavations should include 100 m^2, for a total volume of 60 m^3.

Another transitional Late Archaic to Late Prehistoric occupation is present between 20 and 30 cm at 41BL491. Roof-fall boulders along the edge of the overhang, particularly on the east half of the site, imply that the shelter was much deeper at one time. Looting and erosion have disturbed about one-third of the shelter, most noticeably near the west end. Approximately 225 m^2 of intact deposits at least 50 cm thick may still exist, and some of these deposits are preserved beneath large boulders. Comprehensive data recovery, therefore, should include at least 110 m^3 of hand excavations.

The final rockshelter—41BL589-B—exhibits no evidence of disturbance, has maximum dimensions of 9.25x3.50 m, and contains deposits at least 40 cm thick. A burned rock feature and concurrent peak in cultural materials between 19 and 31 cm are evidence of occupations during the Austin phase of the Late Prehistoric period. Data recovery work at this small shelter should encompass about 33 m^2, with a maximum of 15 m^3 of hand excavation.

BURNED ROCK MOUNDS

Looting is generally not a significant threat to burned rock mounds because the mounds tend to be isolated and generally yield lower numbers of artifacts and fewer projectile points than do burned rock middens. Also, human burials have not been found in mounds on Fort Hood. The primary threats to mounds are military vehicles, maneuvers, and vegetation clearing. These activities have disturbed many burned rock mounds (see Boyd et al. 2000:44–45). Between October 1992 and June 2000, vegetation clearing or military vehicles severely damaged the burned rock mound at 41CV686-A.

Feature 1 at 41CV686-A is a burned rock mound measuring approximately 7.5x6.5x0.6 m. One radiocarbon date reveals that the feature was used during the Toyah phase of the Late Prehistoric period. Although the upper 10–15 cm of deposits have been disrupted, macrobotanical samples from greater depths in the mound yielded seven different taxa of wood and charred remains of three different plant foods. In particular, the unusually high number of oak acorn fragments recovered may indicate that processing this important resource was a significant activity. To date, no other NRHP-eligible burned rock mound on Fort Hood has produced identifiable charred plant remains. This lack of data is due in part to poorer preservation in mounds compared to burned rock middens, but also reflects limited flotation sampling and analysis. The frequency of cultural artifacts (excluding burned rocks) at 41CV686-A is also higher than at any other tested burned rock mound on Fort Hood. The frequency of cultural materials, or number of specimens per cubic meter, in Feature 1 is 420 stone artifacts (252 specimens/0.6 m^3) and 16.7 unmodified bones (10 specimens/0.6 m^3). In contrast, the average recovery per cubic meter for 18 previously excavated mounds is 180 stone artifacts and 3 unmodified bones (Trierweiler, ed. 1996:Table 8.3).

Site 41CV686-A has considerable potential to contribute substantial data about the function and formation of burned rock mounds in central Texas. For this site, Fort Hood should investigate various preservation options, such as using large boulders to deter tank traffic. If data recovery is deemed appropriate, however, complete excavation of the feature should consist of 50 m^2 of hand-excavated units, totaling 25 m^3 and excluding the upper 10 cm of disturbed fill. Three areas of concern should be emphasized—identifying an internal feature(s) within the mound, collecting and processing extensive flotation samples from all contexts within the mound, radiocarbon dating of at least 20 samples from throughout the mound to define its chronology and evolution. No excavations are recommended off-mound because the surrounding Killeen surface is an extensively eroded, ancient, stable landform with almost negligible potential to yield subsurface remains that can be placed in chronological or cultural context.

OPEN CAMPSITES

A variety of activities has affected open campsites at Fort Hood, including historic modifications to the landscape, vegetation clearing, military vehicle maneuvers, and looting. Except for historic modifications, the other disturbances are still possible threats to open campsites (see Boyd et al. 2000:32). The greatest danger is from military vehicles. Extensive cedar clearing undertaken as part of a formal program to conserve water and reestablish grasses for cattle grazing has damaged other sites. Although looting has occurred on some open campsites, it is not a significant threat unless surficial or shallowly buried burned rock midden deposits are present (see Open Campsites and Burned Rock Middens section below).

Of the three open campsites tested in 2000–2001, two contain single, spatially discrete prehistoric components (41BL231-D and 41CV1434-B), and one has three horizontally and vertically separable components (41BL991-B). Recommendations for data recovery investigations, if such become necessary, are presented below.

At 41BL231-D, an occupation zone reveals use of the area during the Late Archaic to Late Prehistoric transition. Buried from 30 to 55 cm in a Holocene alluvial terrace, this component is estimated to extend horizontally at least 10x15 m (and is probably larger). The maximum dimensions of the landform are 12x48 m, and the deposits average 130 cm thick. Although trenching might be helpful, the rough terrain and the environmentally sensitive nature of the area (active springs and bird habitat) preclude the use of a backhoe at this site. If data recovery becomes necessary, the excavations should center around the defined archeological component in the vicinity of the two test units. A 150-m^2 block excavation incorporating the previous test units is recommended. At least 30 of the units should sample the entire thickness (ca. 130 cm) of the Holocene terrace deposits. Comprehensive data recovery should include hand excavation of at least 100 m^3 of fill, assuming that no additional subsurface components are encountered.

One radiocarbon-dated, basin-shaped hearth and an associated artifact assemblage comprise the Late Archaic occupation at 41CV1434-B. This occupation zone is buried in an A horizon at 10–30 cm, but the feature intrudes into the underlying gravelly B horizon to a maximum depth of 53 cm. One backhoe trench and three test units define the component, which has a lateral extent of 20x20 m. Other mechanical and manual excavations across the 40x115-m landform revealed no significant cultural deposits to a maximum depth of 130 cm. Fine-grained sediments up to 150 cm thick are exposed in discontinuous segments of the tributary cutbank, but these areas were not tested. Before conducting data recovery, three backhoe trenches and two test units should be excavated in these areas, thought to be small isolated remnants of inset alluvial fill, to prospect for archeological remains. If no significant cultural materials are encountered in these areas, data recovery should focus on the area between Backhoe Trench 2, the tributary cutbank, and Test Units 3 and 4. A 120-m^2-excavation block should be dug to approximately 50 cm and would sample 60 m^3 of cultural deposits.

There are three cultural components within the upper 150 cm of alluvium at the east end of 41BL991-B. This site is situated in the main cantonment area of Fort Hood, an area not subject to military training activities but where there has been considerable urban development. The site adjoins the City of Killeen, and the expansive grass- and tree-covered area is known locally as Pershing Park. Vegetation clearing, installation of buried utility lines, and other activities have affected the site, and it may be subject to more urban development in the future.

Unmodified bison bones at 80–110 cm in test units located near the south end of Backhoe Trench 23 primarily define a Protohistoric component (Analysis Unit 1) at 41BL991-B. No artifacts are associated, but a radiocarbon-dated bison bone established the component's age. Testing indicates that these remains are restricted to a section of terrace just north of South Nolan Creek. The overlying sediments, which contain sparse cultural materials but no definable cultural component, can be removed mechanically to facilitate excavation of the Protohistoric component. A data recovery excavation block should incorporate the two test units and expose an area of 200 m^2 for a hand-excavated sample of approximately 60 m^3.

A horizontally extensive, thick cumulic paleosol contains varying amounts of archeological materials in a 125x150-m area in the east end of 41BL991-B. Within this 18,750-m^2 area, multiple hearths and associated artifacts were discovered in test units adjoining Backhoe Trenches 22, 23, and 24. These archeological remains encompass at least 4,800 m^2. Although the paleosol is buried between approximately 45 and 135 cm, it ranges in thickness from 40 to 70 cm. The prehistoric remains span almost 630 years, corresponding to the Austin phase of the Late Prehistoric period (Analysis Unit 2). Data recovery here should target the archeological remains within the A horizon of the buried paleosol, with the overburden removed mechanically. Because this area is expansive, up to eight isolated test units should be excavated across this portion of the terrace to help identify specific areas where a block excavation would be most productive.

The third component at 41BL991-B, a probable Late Archaic occupation (Analysis Unit 3), is encapsulated in a vertic soil at 190–210 cm in one unit near the middle of Backhoe Trench 23. This deeply buried component remains poorly defined. If the deposits deeper than 150 cm are to be affected, then 4 to 6 test units should be excavated to sample the deep deposits around Backhoe Trench 23. Data recovery plans might need to be modified contingent on the results of these tests.

OPEN CAMPSITES/ BURNED ROCK MIDDENS

Although any open campsite may be subject to the various threats described above, sites with middens are far more susceptible to the threat of looting. Boyd et al. (2000:32) note that of the 50 open campsites with burned rock middens at Fort Hood considered NRHP eligible, looting has damaged 68 percent (n = 34). Site 41CV580 can be added to the list of NRHP-eligible open campsites and burned rock middens, and it too has evidence of looting associated with its midden, bringing the number of looted open campsites and burned rock middens to 35. Fort Hood should look at various options for protecting these sites, but if data recovery is deemed appropriate for 41CV580, specific recommendations are offered below.

At 41CV580, multiple components are preserved in the Leon River valley wall toeslope and alluvial terrace at depths between 20 and 270 cm. These deposits include hearths, a burned rock midden, and separable peaks in cultural materials corresponding to the Middle Archaic through the Toyah phase of the Late Prehistoric. The entire chronological sequence is present in Test Unit 3, with at least four distinct components (defined as Analysis Units 2–5) from 20 to 270 cm. Because these components are stratigraphically discrete, a block excavation of at least 100 m^2 to a depth of 3 m (or 300 m^3) should be placed around this area. Across a gully and about 20 m east of Backhoe Trench 3, other mechanical and manual excavations revealed one undated component (Analysis Unit 1) and a separate burned rock midden and hearth correlating to the Middle Archaic period (Analysis Unit 5). A second block excavation consisting of a minimum of 100 m^2 to a depth of 2 m (or 200 m^3) is recommended here. This site provides a rare opportunity to sample Middle Archaic occupations that include midden (Block 2) and off-midden (Block 1) components.

Deeper and earlier occupations are possible and perhaps likely at 41CV580, but formal testing did not reach the base of the Holocene-aged sediments. Only one unit went below 200 cm, and it was excavated to a maximum depth of only 270 cm. It is possible that cultural deposits could extend to as much as 5 or 6 m, which is the apparent height of the Holocene terrace above the present channel. The data recovery proposed here assumes that excavations will go down to only 3 m, and this plan does not address any of the deeper cultural deposits that may exist. If data recovery is undertaken, some testing in both excavation blocks should be as deep as possible to search for potential Early Archaic and Paleoindian components. Mechanical excavation should be used sparingly, if at all. The extreme depth of the deposits means that mechanical excavation would be logistically difficult and would almost certainly destroy large amounts of significant archeological deposits in the upper levels. It might be possible to use machines to remove sterile layers between buried components, but even this would be difficult because the stratigraphy is highly variable across short distances.

The 2000–2001 testing season has added nine new sites or subareas to the pool of sites eligible for listing in the NRHP, bringing the total number of eligible sites on Fort Hood to 227 (Table 8.4). Archeological work during this field season reinforces the perception that rockshelters are the most threatened prehistoric sites at Fort Hood and that looting is still prevalent. A quick visit to any of several dozen commercial Internet websites offering central Texas Indian points for sale reveals that the collector's market is alive and well. The 72 NRHP-eligible rockshelters represent a finite number of sites, most of which have already been damaged by looting. It is impossible to know how many rockshelters looting destroyed before archeologists visited them, but the recent destruction of 41BL490 demonstrates that important archeological data in rockshelters continue to be lost. Given the intensity of the commercial trade in prehistoric artifacts throughout central Texas, it will be difficult to control the looting of rockshelters at Fort Hood any time soon. Consequently, it is recommended that Fort Hood accelerate its efforts aimed at initiating various protective strategies for rockshelters (such as gating and surveillance) and developing a data recovery program to salvage archeological data from rockshelters.

Table 8.4. Updated summary of NRHP-eligible prehistoric sites on Fort Hood

Site Type	No. of NRHP-eligible Subareas as of September 2000*	No. of NRHP-eligible Subareas Added in 2000–2001	Total No. of Subareas
Medicine Wheel	1	–	1
Lithic Scatter	2	–	2
Rock Art	1	–	1
Open Campsite	43	3	46
Open Campsite/Burned-Rock Midden	50	1	51
Paluxy	19	–	19
Burned-Rock Mound	15	1	16
Burned-Rock Midden	15	–	15
Rockshelter	68	4	72
Cave/Sinkhole	4	–	4
Totals	218	9	227

* Number of NRHP-eligible sites taken from Boyd et al. (2000:Table 9).

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APPENDIX A: SUMMARY OF RADIOCARBON DATES

Table A.1. Summary of radiocarbon dates

Beta Sample	Site	Field Sample No.	Sample Material and Weight (g)	Wood Identification	Sample Provenience	Feature Association	Conventional Age B.P.	$^{13}C/^{12}C$ Ratio (‰)	Calibrated Calendrical Date, 2-sigma Range*
Beta-149097	41BL43	C-4	charcoal, 0.1	–	TU 2, north wall (37 cm)	–	820 ± 40	–25.6	
Beta-149098	41BL43	C-6	charcoal, <0.1	–	TU 2 (85 cm)	–	1170 ± 40	–25.8	A.D. 1160–1280
Beta-149099	41BL231-D	F-3	charcoal, <0.1	–	TU 3 (40–50 cm)	1	1160 ± 40	–25.3	A.D. 770–980
Beta-149100	41BL231-D	F-4	charcoal, <0.1	–	TU 2 (40–50 cm)	1	1220 ± 40	–24.2	A.D. 780–980
Beta-149101	41BL488-A	C-1	charcoal, 0.6	*Quercus* sp.	TU 1, Rockshelter 1 (16 cm)	–	960 ± 40	–25.8	A.D. 690–900
Beta-149102	41BL488-A	C-3	charcoal, 0.2	*Juniperus* sp.	TU 3, Rockshelter 2 (10–20 cm)	–	1240 ± 40	–23.8	A.D. 1000–1180
Beta-149103	41BL491	C-1	charcoal, 0.5	*Juniperus* sp.	TU 1 (20–30 cm)	–	1320 ± 40	–25.2	A.D. 680–890
Beta-149104	41BL589-B	C-1	charcoal, 0.3	*Quercus* sp.	TU 1 (26 cm)	1	1080 ± 40	–26.1	A.D. 650–780
Beta-153666**	41BL991-B	C-14	charcoal, 13.6	*Quercus* sp.	TU 3 (112 cm)	1	1060 ± 70	–26.4	A.D. 890–1020
Beta-153667	41BL991-B	F-4	charcoal, 0.1	–	TU 4 (45–70 cm)	2	1200 ± 50	–24.4	A.D. 810–1150
Beta-153668	41BL991-B	F-6	charcoal, <0.1	–	TU 6 (130–135 cm)	3	1100 ± 40	–26.2	A.D. 690–970
Beta-153669	41BL991-B	F-8	charcoal, 0.1	–	TU 2 (75–93 cm)	4	880 ± 40	–27.2	A.D. 880–1010
Beta-153670	41BL991-B	F-15	charcoal, 0.1	–	TU 3 (87–95 cm)	–	690 ± 40	–23.8	A.D. 1030–1250
Beta-153671	41BL991-B	none	bone collagen***	n/a	BHT 23 (100 cm)	–	160 ± 40	–11.1	A.D. 1270–1390
Beta-149105	41CV580	C-3	charcoal, 0.3	*Celtis* sp.	TU 3 (40 cm)	–	630 ± 40	–24.1	A.D. 1660–1950
Beta-149106	41CV580	C-9	charcoal, 0.1	indeterminate	TU 3 (98 cm)	3	1080 ± 40	–26.1	A.D. 890–1020
Beta-149107	41CV580	C-10	charcoal, <0.1	–	TU 2 (120 cm)	2	3660 ± 40	–25.1	2140–1910 B.C.
Beta-149108	41CV580	C-11	charcoal, <0.1	–	TU 3 (140 cm)	–	1770 ± 40	–27.1	A.D. 140–380
Beta-149109	41CV580	C-15	charcoal, 0.2	*Quercus* sp.	TU 2 (150 cm)	2	3650 ± 40	–25.4	2140–1910 B.C.
Beta-149111	41CV580	C-17	charcoal, <0.1	–	TU 3 (258 cm)	–	3700 ± 40	–26.4	2200–1960 B.C.
Beta-155427	41CV686-A	C-2	charcoal, 0.5	–	TU 1 (44 cm)	1	710 ± 40	–26.8	A.D. 1260–1380
Beta-149112	41CV1434-B	F-2	charcoal, <0.1	–	TU 1 (11–53 cm)	2	2180 ± 40	–26.6	370–110 B.C.

* Dates were calibrated by Beta Analytic, Inc. using INTCAL98 (Stuiver et al. 1998).
** Standard radiometric date; all other dates were done using the accelerator mass spectrometer method.
*** A small amount of bone was extracted from a bison calcaneus (right) by Beta Analytic, Inc.

APPENDIX B: SOIL STRATIGRAPHIC PROFILES

Karl W. Kibler

and

Amy M. Holmes

The authors examined and described geologic profiles for 18 of the 19 sites (19 of the 20 subareas) investigated in the 2000–2001 field season. Kibler examined profiles at 41BL231-D, 41BL989-B, 41BL993-B, 41CV70-B, 41CV118-B, 41CV506-B, 41CV580, 41CV669-B, 41CV730-B, and 41CV1434-B; Holmes examined profiles at 41BL43, 41BL142-A, 41BL231-B, 41BL488-A, 41BL490, 41BL491, 41BL589-B, 41BL991-B, and 41BL1039-B. No geological profile descriptions were done at 41CV686-A, which consists of a burned rock mound resting on bedrock.

Each soil-stratigraphic description is based on a 50–100 cm wide exposure within the trench or test unit wall. Soil-stratigraphic descriptions use the neutral term "zone" to describe pedogenic and stratigraphic variation within the profile under a single term. Each zone is numbered sequentially from the top (surface) down. For each zone the depth, thickness, color, consistence, texture, soil structure, mottles, inclusions (e.g., gravel content), and nature of the lower boundary were described according to the procedures and criteria Buol et al. (1980:21–43) and the Soil Survey Staff (1996) presented.

The color (Munsell Soil Color Chart) and consistence (loose, very friable, friable, firm, very firm, and extremely firm) of a zone or sediment were recorded from a moist condition. Textural classifications are based on field estimates (see Olson 1976:19) of the relative proportions of particle sizes less than 2.0 mm in diameter (i.e., sand, silt, and clay). Twelve textural classes, based on the U.S. Department of Agriculture's textural classification of soils (Soil Survey Staff 1996:631) are used. The textural name is prefaced by the term gravelly if 20–50 percent of the sediment by volume is of gravel size (2–76 mm) or very gravelly if 50–90 percent of the sediment is of gravel size. Where there is little or no pedogenic alteration, it was more appropriate to describe the textural classes based on the percentages of gravels and the ratio of sand to mud (silt and clay) following Folk (1954; 1974). This classification scheme has 12 textural classes:

sand	silt loam
silty clay loam	loamy sand
silt	sandy clay
sandy loam	sandy clay loam
silty clay	loam
clay loam	clay

Soil structure characteristics include grade, size, and type. The grade is shown as weak, moderate, or strong. The size of the peds is shown as fine, medium, or coarse, depending on ped morphology or type. The type, referring to the shape of the peds, is identified as blocky (subangular and angular), platy, prismatic, columnar, or granular. Soil horizons not containing these characteristics are considered structureless. If preserved, sedimentary structures are noted and described.

Mottles are described by color, abundance, contrast, and size. Abundance is shown as few (<2 percent), common (2–20 percent), and many (>20 percent), and contrast is described as faint, distinct, or prominent. Size ranges are given as fine (<0.5 cm), medium (0.5–1.5 cm), or coarse (>1.5 cm). The lower boundary of each zone is described in terms of distinctiveness—very abrupt (<0.1 cm), abrupt (0.1–2.5 cm), clear (2.5–6.4 cm), gradual (6.4–12.7 cm), and diffused (>12.7 cm)—and topography—smooth, wavy, irregular, and broken. Final soil horizon designations were made based on the guidelines and criteria of Birkeland (1984) and the Soil Survey Staff (1996).

For sediments in rockshelters (41BL43, 41BL142-A, 41BL231-B, 41BL488-A, 41BL490, 41BL491, and 41BL589-B), stratigraphic zones are interpreted as being one of six types of shelter fill defined by Abbott (1995:833–837; also see Mehalchick et al. 1999:Table 1). Types 1 and 2 are endogenous silts and spalls, with Type 1 having a homogenous composition and Type 2 characterized by multicolored stratified lenses. Types 3 and 4 are exogenous clay loams, with Type 3 being black and Type 4 being red. Type 5 is travertine deposits that developed from in situ ground water discharge. Type 6 represents either coarse limestone lag gravels where fine-grained sediments have been washed away or bare limestone floors where all sediments have been removed.

Site 41BL43

Test Unit 2, north wall

Zone 1	0–6 cm	Grayish brown (10YR 5/2 moist) gravelly sandy loam, friable, weak coarse subangular blocky structure, subangular limestone pebbles abrupt irregular boundary. Type 1 rockshelter sediments, AC1 horizon.
Zone 2	6–32 cm	Gray (10YR 6/1 moist) sandy loam, friable, weak medium subangular blocky structure, subangular limestone pebbles (roof fall), common fire cracked rocks, clear smooth boundary. Type 1 rockshelter sediments, AC1 horizon.
Zone 3	32–54 cm	Light gray (10YR 7/2 moist) gravelly sandy loam, massive, subangular limestone cobbles, gradual smooth boundary. Type 1 rockshelter sediments, Cr1 horizon.
Zone 4	54–119 cm	Light gray (10YR 7/2 moist) sandy clay loam, massive, few subangular limestone pebbles, lower boundary not observed. Type 1 rockshelter sediments, Cr2 horizon.

Site 41BL142-A

Test Unit 2, west wall

Zone 1	0–25 cm	Black (10YR 2/1 moist) sandy clay loam, friable, moderate medium subangular blocky structure, common subangular limestone cobbles, abrupt smooth boundary. Type 3 rockshelter sediments, A horizon.
Zone 2	25–75 cm	Dark yellowish brown (10YR 3/4 moist) sandy clay loam, weak subangular blocky to coarse granular structure, slightly hard, many subangular limestone boulders, matrix-supported. Type 1 rockshelter sediments and roof fall, C horizon.

Site 41BL231-B

Test Unit 1, south wall

Zone 1	0–6 cm	Very dark grayish brown (10YR 3/2 moist) sandy clay loam, friable, weak fine subangular blocky structure parting to coarse granular structure, common subangular limestone pebbles, abrupt smooth boundary. Type 3 rockshelter sediments, A1 horizon.
Zone 2	6–36 cm	Very dark grayish brown (10YR 3/2 moist) sandy clay loam, firm, moderate coarse subangular blocky structure, common subangular limestone pebbles, lower boundary not observed. Type 3 rockshelter sediments, A2 horizon.

Site 41BL231-D

Test Unit 3, south wall

Zone 1	0–59 cm	Very dark gray (10YR 3/1, moist) silty clay loam, friable, weak medium blocky subangular parting to coarse granular structure, 15 percent limestone gravels (subangular to angular, matrix-supported, granule- to pebble-sized), few burned rocks, gradual smooth lower boundary. Late Holocene colluvium and slopewash, A horizon.

Zone 2 59–113 cm Grayish brown (10YR 5/2, moist) silty clay loam, friable, moderate medium blocky subangular structure, 10 percent limestone gravels (subangular to angular, matrix-supported, granule- to pebble-sized), few $CaCO_3$ filaments, abrupt smooth lower boundary. Late Holocene colluvium and slopewash, Bw horizon.

Zone 3 113–127+ cm Weathered limestone bedrock, R horizon.

Site 41BL488-A

Test Unit 1, south wall

Zone 1 0–52 cm Black (10YR 2/1 moist) gravelly silt loam, friable, weak fine parting to very fine subangular blocky structure, many subangular limestone cobbles, many fine roots, very abrupt smooth boundary. Type 3 rockshelter sediments, A horizon.

Test Unit 3, south wall

Zone 1 0–3 cm Very dark grayish brown (10YR 3/2 moist) gravelly silty clay loam, friable, weak very fine subangular blocky structure, common subangular limestone pebbles, abrupt smooth boundary. Type 3 rockshelter sediments, A horizon.

Zone 2 3–36 cm Black (10YR 2/1 moist) gravelly silty loam, firm, moderate angular blocky structure, common subangular limestone cobbles, lower boundary not observed. Type 3 rockshelter sediments, AC horizon.

Site 41BL490

Test Unit 1, north wall

Zone 1 0–47 cm Light gray (10YR 7/1 moist) silty clay loam, massive, single grain, common coarse roots, abrupt smooth boundary. Type 1 rockshelter sediments and roof fall, AC horizon.

Zone 2 47–68 cm Light gray (10YR 7/1 moist) silty clay loam, massive, common distinct fine mottles, yellow (10YR 8/6 m), common medium roots, lower boundary not observed. Type 1 rockshelter sediments, Cr horizon.

Test Unit 2, south wall

Zone 1 0–26 cm Grayish brown (10YR 5/2 moist) silty clay loam, friable, weak very fine subangular blocky structure, common subangular limestone pebbles, abrupt irregular boundary. Type 1 rockshelter sediments, AC horizon.

Zone 2 26–51 cm Very pale brown (10YR 7/4 moist) silty clay loam, friable, weak fine subangular blocky structure, common distinct fine mottles, brownish yellow (10YR 6/6 moist), lower boundary not observed. Type 1 rockshelter sediments, C horizon.

Site 41BL491

Test Unit 1, north wall

Zone 1 0–36 cm Very dark gray (10YR 3/1 moist) silty clay loam, massive, common subangular limestone pebbles and cobbles, common fine soft carbonate masses, lower boundary not observed. Type 3 rockshelter sediments, AC horizon.

Site 41BL589-B

Test Unit 1, east wall

Zone 1	0–6 cm	Very dark brown (10YR 2/2 moist) loam, very friable, weak fine subangular blocky parting to coarse granular structure, common leaves and twigs, abrupt smooth boundary, Oi horizon.
Zone 2	6–45 cm	Very dark brown (10YR 2/2 moist) silty clay loam, friable, moderate coarse subangular blocky structure, common subangular limestone cobbles, common very coarse roots, lower boundary not observed. Type 3 rockshelter sediments, AC horizon.

Site 41BL989-B

Backhoe Trench 1, east wall

Zone 1	0–48 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate coarse granular structure, 40–50 percent limestone gravels (granule- to pebble-sized, subangular to subrounded, matrix-supported), abrupt wavy lower boundary. Late Holocene Ford alluvium and slopewash, Ap horizon.
Zone 2	48–122 cm	Very dark gray (2.5Y 3/1, moist) clay, very firm, strong medium subangular blocky structure, 10 percent limestone gravels (granule-sized, angular to subangular, matrix-supported), common sand-sized carbonate clasts, few clay films on ped faces, thin bed of rounded pebble-sized gravels at 91 cm, abrupt smooth lower boundary. Late Holocene Ford alluvium, A horizon.
Zone 3	122–163+ cm	Dark gray (10YR 4/1, moist) clay, very firm, strong fine angular blocky structure, few distinct fine (10YR 5/4, moist) mottles, 25 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), common sand-sized carbonate clasts, lower boundary not observed. Late Holocene West Range alluvium, Bw horizon.

Backhoe Trench 2, west wall

Zone 1	0–25 cm	Very dark gray (10YR 3/1, moist) silty clay loam, firm, moderate medium granular structure, 10 percent limestone gravels (granule- to pebble-sized, subangular, matrix-supported), clear smooth lower boundary. Late Holocene Ford alluvium and slopewash, A horizon.
Zone 2	25–79+ cm	Grayish brown (2.5Y 5/2, moist) clay, very firm, moderate fine angular blocky structure, few clay films on ped faces, common distinct medium (10YR 4/4, moist) mottles, 20 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), common redoximorphic features, lower boundary not observed. Late Holocene West Range alluvium, Bw horizon.

Site 41BL991-B

Backhoe Trench 1, east wall

Zone 1	0–18 cm	Very dark brown (10YR 2/2 moist) silty clay loam, friable, weak coarse angular blocky structure, abrupt wavy boundary. Late Holocene West Range alluvium, A horizon.
Zone 2	18–39 cm	Very pale brown (10YR 8/3 moist) gravelly silty clay loam, massive matrix-supported gravel bed composed of 35–60 percent subrounded limestone

granules and pebbles, common fine distinct gray (10YR 5/1 moist) and yellow (10YR 8/8 moist) mottles. Late Holocene West Range alluvium, BC horizon.

Zone 3 39–50 cm Black (10YR 2/1 moist) silty clay, firm, moderate coarse angular blocky structure, fine distinct clay cutans on ped faces, few interlocking slickensides, <15 percent subangular granules and pebbles (translocated), abrupt wavy boundary. Late Holocene West Range alluvium, 2Btssb horizon.

Zone 4 50–100 cm Yellowish brown (10YR 5/4 moist) gravelly very coarse loamy sand, planar-bedded and poorly sorted subrounded limestone granules and pebbles with shell fragments, loose, boundary not observed. Late Holocene West Range alluvium, 3C horizon.

Backhoe Trench 2

Zone 1 0–10 cm Light yellowish brown (10YR 6/4 moist) gravelly silty clay (15–35 percent), friable, weak medium angular blocky structure, common fine distinct clay cutans on ped faces and bridges, abrupt smooth boundary. Late Holocene West Range alluvium, A horizon.

Zone 2 10–80 cm Black (10YR 2/1 moist) silty clay, firm, weak very coarse subangular blocky structure, common prominent clay cutans on ped faces, few interlocking slickensides, few irregular segregated carbonate filaments increasing toward the lower boundary, gradual wavy boundary. Late Holocene West Range alluvium, Btss horizon.

Zone 3 80–154 cm Black (10YR 2/1 moist) silty clay, firm, weak very coarse parting to coarse angular blocky structure, common prominent clay cutans on ped faces, few interlocking slickensides, common irregular segregated carbonate filaments, clear smooth boundary. Late Holocene West Range alluvium, Btssk horizon.

Zone 4 154+ cm Yellowish brown (10YR 5/4 moist) gravelly silty clay, massive, firm, 15–35 percent subrounded limestone granules and pebbles lower boundary not observed. Late Holocene West Range alluvium, C horizon.

Backhoe Trench 4, south wall

Zone 1 0–56 cm Dark brown (10YR 3/3 moist) silty clay loam, friable, weak medium subangular blocky structure, <15 percent subrounded limestone granules and pebbles, few fine clay cutans on ped faces, abrupt smooth boundary. Late Holocene West Range alluvium, A horizon.

Zone 2 56–80 cm Black (10YR 2/1 moist) silty clay, firm, weak coarse angular blocky structure, <15 percent subangular granules and pebbles with shell fragments, common prominent clay cutans on ped faces, abrupt smooth boundary. Late Holocene West Range alluvium, Ab horizon.

Zone 3 80–173 cm Grayish brown (10YR 5/2 moist) silty clay, firm, weak coarse angular blocky structure, common fine prominent clay cutans on ped faces, common medium distinct yellowish brown (10YR 5/8 moist) mottles, lower boundary not observed. Late Holocene West Range alluvium, Btb horizon.

Backhoe Trench 6, west wall

Zone 1 0–75 cm Very dark grayish brown (10YR 3/2 moist) gravelly silty clay loam, friable,

		weak medium subangular blocky structure, 15–35 percent subangular limestone granules and shell fragments, abrupt smooth boundary. Late Holocene West Range alluvium, AC horizon.
Zone 2	75–100 cm	Very dark grayish brown (10YR 3/2 moist) matrix-supported gravel bed, massive, firm, few fine distinct clay cutans on ped faces, 36–60 percent subrounded limestone granules, pebbles, and cobbles, lower boundary not observed. Late Holocene West Range alluvium, 2C horizon.

Backhoe Trench 7

Zone 1	0–33 cm	Dark brown (10YR 3/3 moist) silty clay loam, very friable; weak coarse subangular blocky structure, common snail shells, abrupt smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	33–56 cm	Brownish yellow (10YR 6/6 moist) clast-supported moderate to poorly sorted subangular to subrounded very coarse sand, limestone granules and pebbles, 35–60 percent, abrupt wavy boundary. Holocene colluvium, 2C horizon.
Zone 3	56–85 cm	Black (2.5Y 2/1 moist) silty clay, moderate very coarse angular blocky structure, firm, few faint clay cutans on ped faces, few interlocking slickensides, <15 percent subrounded limestone granules and shell fragments, abrupt wavy boundary. Late Holocene West Range alluvium, 3Ab horizon.
Zone 4	85–135 cm	Very dark grayish brown (10YR 3/2 moist) silty clay, moderate subangular blocky structure, firm, common fine distinct clay cutans on ped faces and bridges, <15 percent subangular limestone granules and shell fragments, lower boundary not observed. Late Holocene West Range alluvium, 3BC horizon.

Backhoe Trench 8, east wall (north end of trench)

Zone 1	0–33 cm	Dark grayish brown (10YR 4/2 moist) silty clay loam, friable, weak coarse subangular blocky structure, clear smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	33–100 cm	Brown (10YR 4/3 moist) silty clay, firm, weak coarse subangular blocky structure, common fine clay cutans on bridges, abrupt smooth boundary. Late Holocene Ford alluvium, Bt horizon.
Zone 3	100–125 cm	Very dark grayish brown (10YR 3/2 moist) silty clay, firm, massive, clear smooth boundary. Late Holocene West Range alluvium, Abt horizon.
Zone 4	125–162 cm	Dark grayish brown (10YR 4/1 moist) clay, firm, massive, lower boundary not observed. Late Holocene West Range alluvium, Bss horizon.

Backhoe Trench 8, east wall (south end of trench)

Zone 1	0–77 cm	Very dark grayish brown (10YR 3/2 moist) silty clay, firm, moderate coarse angular blocky structure, few fine faint clay cutans on ped faces, clear smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	77–105 cm	Black (10YR 2/1 moist) silty clay, firm, moderate coarse angular blocky structure, abrupt smooth boundary. Late Holocene West Range alluvium, 2Ab horizon.

Zone 3	105–115 cm	Yellow (10YR 6/8 moist) clast-supported gravel bed, moderately sorted coarse sand, limestone granules, pebbles and cobbles with shell fragments, lower boundary not observed. Late Holocene West Range alluvium, 3C horizon.

Backhoe Trench 9, northwest wall

Zone 1	0–15 cm	Very dark gray (10YR 3/1 moist) gravelly silty clay loam, poorly sorted, weak fine granular structure, 35–60 percent matrix-supported subrounded to subangular limestone granules, pebbles, cobbles, and shell fragments, abrupt irregular boundary. Late Holocene West Range alluvium, AC1 horizon.
Zone 2	15–82 cm	Dark gray (10YR 4/1 moist) gravelly silty clay loam, very friable, weak fine subangular blocky structure, 35–60 percent poorly sorted subrounded to subangular limestone granules, pebbles, cobbles, and shell fragments, matrix-supported, pinches out at SW end of trench, abrupt irregular boundary. Late Holocene West Range alluvium, AC2 horizon.
Zone 3	82–95 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, firm, weak medium subangular blocky structure, <15 percent very coarse subrounded sand and granules, clear smooth boundary. Late Holocene West Range alluvium, Ab horizon.
Zone 4	95–130 cm	Dark grayish brown (2.5Y 4/2 moist) silty clay loam, firm, moderate coarse subangular blocky structure, common fine irregular carbonate nodules, clear smooth boundary. Late Holocene West Range alluvium, Bkb horizon.
Zone 5	130–155 cm	Very dark grayish brown (10YR 3/2 moist) silty clay, firm, moderate coarse angular blocky structure, common distinct clay cutans on ped faces, <15 percent subangular limestone granules, lower boundary not observed. Late Holocene West Range alluvium, C horizon.
Zone 6	155–190 cm	Very pale brown (10YR 7/3 moist) limestone bedrock, R horizon.

Backhoe Trench 11, southwest wall

Zone 1	0–32 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, very friable, weak fine subangular blocky structure, <15 percent subrounded to subangular limestone granules and pebbles, clear smooth boundary. Late Holocene West Range alluvium, A horizon.
Zone 2	32–57 cm	Dark brown (10YR 3/1 moist) very dark gray silty clay loam, friable, moderate coarse subangular blocky structure, <15 percent subrounded to subangular granules, clear smooth boundary. Late Holocene West Range alluvium, Bt horizon.
Zone 3	57–77 cm	Brown (10YR 5/3 moist) silty clay, firm, moderate coarse subangular blocky structure, common distinct medium yellowish brown (10YR 5/6 moist) mottles, few distinct clay cutans on ped faces, few Fe+ nodules, common fine irregular soft carbonate masses, abrupt smooth boundary. Late Holocene West Range alluvium, Btk horizon.
Zone 4	77–115 cm	Very dark grayish brown (10YR 3/2 moist) clay, massive, firm, <15 percent subangular limestone pebbles, very abrupt smooth boundary. Late Holocene West Range alluvium, C horizon.

Backhoe Trench 15, north wall

Zone 1	0–20 cm	Pale brown (10YR 6/3 moist) gravelly silty clay loam, firm, matrix-supported gravel bed, weak medium subangular blocky structure, 15–35 percent subrounded limestone granules, pebbles, cobbles and natural chert, abrupt wavy boundary, AC horizon.
Zone 2	20–67 cm	Yellowish brown (10YR 5/4 moist) coarse sandy clay loam, firm, moderate coarse subangular blocky structure, <15 percent subangular granules, fine common distinct clay cutans on ped faces, abrupt smooth boundary. Late Holocene West Range alluvium, Bw horizon.
Zone 3	67–83 cm	Black (10YR 2/1 moist) silty clay, very firm, moderate coarse angular blocky structure, 15–35 percent subrounded limestone granules, common fine irregular segregated carbonate filaments, fine common fine prominent clay cutans on ped faces, clear smooth boundary. Late Holocene West Range alluvium, Ab horizon.
Zone 4	83–110 cm	Dark brown (10YR 3/3 moist) clay, strong and massive, common interlocking slickensides, lower boundary not observed. Late Holocene West Range alluvium, Btssb horizon.
Zone 5	110+ cm	Very pale brown (10YR 8/3 dry) weathered limestone bedrock, Cr horizon.

Backhoe Trench 16, southeast wall

Zone 1	0–45 cm	Very dark gray (10YR 3/1 moist) silty clay loam, friable, weak coarse subangular blocky structure, <15 percent subrounded limestone granules and pebbles, abrupt wavy boundary. Late Holocene Ford alluvium, AC horizon.
Zone 2	45–55 cm	Very dark gray (10YR 3/1 moist) silty clay loam, friable, matrix-supported gravel bed, weak coarse subangular blocky structure, 35–60 percent subangular very coarse sand, limestone granules, pebbles, cobbles, one burned rock fragment, clear wavy boundary. Late Holocene Ford alluvium, BC horizon.
Zone 3	55–96 cm	Black (10YR 2/1 moist) gravelly silty clay loam, firm, moderate coarse angular blocky structure, 15–35 percent subrounded to subangular limestone granules and pebbles, common fine distinct clay cutans on ped faces, clear wavy boundary. Late Holocene West Range alluvium, Ab horizon.
Zone 4	96–207 cm	Very dark grayish brown (10YR 3/2 moist) clay, very firm, strong medium subangular blocky structure, common fine prominent clay cutans on ped faces, common fine irregular segregated carbonate filaments, common interlocking slickensides, <15 percent subangular siliceous and limestone granules and pebbles (translocation), clear smooth boundary. Late Holocene West Range alluvium, Btssb horizon.
Zone 5	207–215 + cm	Light olive brown (2.5Y 5/3 moist) clay, firm, massive, common distinct medium dark yellowish brown (10YR 4/6 moist) and gray (10YR 5/1 moist) mottles, common fine irregular segregated carbonate filaments, <15 percent subrounded limestone granules, bedrock fragments observed at base of trench, lower boundary not observed. Late Holocene West Range alluvium, Cr horizon.

Backhoe Trench 21, southwest wall

Zone 1	0–33 cm	Dark grayish brown (10YR 4/2 moist) silty clay, firm, moderate medium subangular blocky parting to platy structure, common fine distinct clay cutans on ped faces, <15 percent subangular limestone granules, pebbles, and cobbles, abrupt wavy boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	33–44 cm	Very dark grayish brown (10YR 3/2 moist) gravelly sandy clay, matrix-supported gravel bed, 35–65 percent subrounded very coarse sand, limestone granules and pebbles, abrupt wavy boundary. Late Holocene Ford alluvium, BC horizon.
Zone 3	43–62 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, friable, weak coarse subangular blocky structure, few fine distinct clay cutans on ped faces, <15 percent subrounded limestone granules and pebbles, clear wavy boundary. Late Holocene West Range alluvium. Ab horizon.
Zone 4	62–150 cm	Grayish brown (10YR 5/2 moist) silty clay loam, firm, moderate coarse angular blocky structure, <15 percent subrounded to subangular limestone pebbles, common medium distinct yellowish brown (10YR 5/8 moist) and gray (10YR 5/1 moist) mottles, common interlocking slickensides, common brownish yellow (10YR 6/8 moist) iron nodules, lower boundary not observed. Late Holocene West Range alluvium, Bssb horizon.
Zone 5	150+ cm	Grayish brown (10YR 5/2 moist) silty clay, massive, very firm, common fine distinct medium yellowish brown (10YR 5/8 moist) and gray (10YR 5/1 moist) mottles, common fine prominent clay cutans on ped faces, lower boundary not observed. Late Holocene West Range alluvium, Btssb horizon.

Backhoe Trench 22, northwest wall

Zone 1	0–22 cm	Dark yellowish brown (10YR 4/4 moist) silty clay loam, friable, weak coarse subangular blocky structure, <15 percent subangular very coarse sand and limestone granules, abrupt smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	22–46 cm	Yellowish brown (10YR 5/4 moist) silty clay loam, friable, weak coarse subangular blocky structure, abrupt smooth boundary. Late Holocene Ford alluvium, Bw horizon.
Zone 3	46–53 cm	Very pale brown (10YR 7/3 moist) clast-supported gravel bed, common shell fragments and subangular to subrounded very coarse sand and granules with few subrounded limestone pebbles oriented 45°, abrupt smooth boundary. Late Holocene Ford alluvium, C1 horizon.
Zone 4	53–73 cm	Very pale brown (10YR 7/3 moist) clast-supported gravel bed, common subrounded limestone granules and pebbles oriented 40°, abrupt smooth boundary. Late Holocene Ford alluvium, C2 horizon.
Zone 5	73–111 cm	Black (10YR 2/1 moist) gravelly silty clay, firm, moderate coarse subangular blocky structure, 15–35 percent subrounded very coarse sand and granules, common interlocking slickensides, common fine clay cutans on ped faces and pores, abrupt smooth boundary. Late Holocene West Range alluvium, 2Ab horizon.

Zone 6 111–142 cm Very dark gray (10YR 3/1 moist) silty clay, matrix-supported gravel bed, moderate angular blocky structure, subangular to subrounded limestone granules and pebbles, common interlocking slickensides, clear irregular boundary. Late Holocene West Range alluvium, 2BCb horizon.

Zone 7 142+ cm Dark brown (10YR 3/3 moist) clay, very firm, moderate coarse subangular blocky structure, <15 percent subangular limestone pebbles and cobbles at base of trench, many interlocking slickensides, medium common clay cutans on ped faces and pores, lower boundary not observed. Late Holocene West Range alluvium, 2Btssb horizon.

Backhoe Trench 23, southeast wall

Zone 1 0–21 cm Dark grayish brown (10YR 4/2 moist) silt loam, very friable, weak medium subangular blocky structure, <15 percent subrounded limestone granules, clear smooth boundary. Late Holocene West Range alluvium, A horizon.

Zone 2 21–72 cm Dark grayish brown (10YR 4/2 moist) silty clay loam, friable, weak medium subangular blocky structure, <15 percent subrounded very coarse sand and limestone granules, clear smooth boundary. Late Holocene West Range alluvium, AB horizon.

Zone 3 72–129 cm Very dark grayish brown (10YR 3/2 moist) silty clay loam, friable, moderate medium subangular blocky structure, and light olive brown (2.5Y 5/4 moist) gravel beds, moderately sorted subrounded very coarse sand, limestone granules, pebbles, and cobbles, common carbonate coatings and carbonate filaments (Stage I+), abrupt smooth boundary. Late Holocene West Range alluvium, C horizon.

Zone 4 129–161 cm Very dark gray (10YR 3/1 moist) clay loam, friable, moderate coarse angular blocky parting to coarse granular structure, <15 percent subrounded limestone pebbles in slickensides, common interlocking slickensides, common medium prominent clay cutans on ped faces and sand coats, clear smooth boundary. Late Holocene West Range alluvium, 2Abt horizon.

Zone 5 161–205 cm Very dark gray (10YR 3/1 moist) clay, very firm, strong coarse angular blocky structure, many medium prominent clay cutans on ped faces, common interlocking slickensides, common medium soft carbonate concretions, lower boundary not observed. Late Holocene West Range alluvium, 2Btssb horizon.

Site 41BL993-B

Backhoe Trench 1, north wall

Zone 1 0–41 cm Artificial fill.

Zone 2 41–72 cm Very dark gray (10YR 3/1, moist) silty clay loam, firm, moderate fine subangular blocky structure, 2 percent limestone gravels (granule-sized, subrounded, matrix-supported), clear smooth lower boundary. Late Holocene West Range alluvium, Ab horizon.

Zone 3 72–100 cm Very dark gray (10YR 4/1, moist) silty clay loam, firm, strong fine angular blocky structure, 10 percent limestone gravels (granule-sized, subrounded, matrix-supported), clear smooth lower boundary. Late Holocene West Range alluvium, Bb horizon.

Zone 4	100–145 cm	Grayish brown (10YR 5/2, moist) clay loam, very firm, strong fine angular blocky structure, common distinct medium (10YR 5/6, moist) mottles, 2 percent limestone gravels (granule-sized, subrounded, matrix-supported), abrupt smooth lower boundary. Late Holocene West Range alluvium, BCb horizon.
Zone 5	145+ cm	Lower Cretaceous Walnut Formation, R horizon.

Backhoe Trench 5, east wall

Zone 1	0–27 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate medium subangular blocky structure, 5 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), gradual smooth lower boundary. Late Holocene West Range alluvium, A horizon.
Zone 2	27–99 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, strong medium angular blocky structure, common clay films on ped faces, 10 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), clear smooth lower boundary. Late Holocene West Range alluvium, AB horizon.
Zone 3	99–160 cm	Dark grayish brown (10YR 4/2, moist) clay loam, very firm, moderate fine angular blocky structure, 5 percent limestone gravels (granule-sized, subrounded, matrix-supported), clear smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.
Zone 4	160–183+ cm	Mottled light yellowish brown (10YR 6/4, moist) and very pale brown (10YR 7/3, moist) silty clay loam, firm, moderate fine angular blocky structure, 2 percent limestone gravels (granule-sized, subrounded, matrix-supported), common redoximorphic features, lower boundary not observed. Late Holocene West Range alluvium, Cox horizon.

Backhoe Trench 17, east wall

Zone 1	0–70 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate medium granular structure, common distinct coarse (10YR 5/2, moist) mottles, 25 percent limestone gravels (granule- to pebble-sized, subrounded to rounded, matrix-supported), abrupt smooth lower boundary. Late Holocene Ford alluvium and slopewash, AC horizon.
Zone 2	70–116+ cm	Very dark gray (10YR 3/1, moist) clay loam, very firm, strong fine angular blocky structure, common clay films on ped faces, common oxidized cutans, 5–10 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), gravel content increases to 50 percent at the base of the zone, very thin gravel beds in the bottom half of the zone, lower boundary not observed. Late Holocene West Range alluvium, 2Btb horizon.

Backhoe Trench 18, west wall

Zone 1	0–24 cm	Dark gray (10YR 4/1, moist) clay loam, firm, moderate fine angular blocky structure, 25 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), clear smooth lower boundary. Late Holocene Ford alluvium and slopewash, Ap horizon.
Zone 2	24–69 cm	Very dark grayish brown (10YR 3/2, moist) clay loam, firm, weak thin platy structure, 10 percent limestone gravels (granule- to pebble-sized, subrounded, matrix-supported), common krotovina, clear smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.

Zone 3	69–114 cm	Dark gray (10YR 4/1, moist) clay, very firm, moderate fine subangular blocky structure, few oxidized cutans, common distinct coarse (7.5YR 2.5/1, moist) mottles, 5 percent limestone gravels (granule- to pebble-sized, subangular to subrounded, matrix-supported), abrupt smooth lower boundary. Late Holocene West Range alluvium, 2Btb horizon.
Zone 4	114–165 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate medium subangular blocky structure, common clay films on ped faces, 5 percent limestone gravels (granule-sized, subrounded, matrix-supported), abrupt smooth lower boundary. Late Holocene West Range alluvium, 2Btb2 horizon.
Zone 5	165–205+ cm	Rounded, clast-supported gravels (granule- to cobble-sized), lower boundary not observed. Late Holocene West Range alluvium, 2C horizon.

Backhoe Trench 19, east wall (southern end)

Zone 1	0–21 cm	Very dark gray (10YR 3/1, moist) silty clay loam, firm, weak medium granular structure, 2 percent limestone gravels (granule-sized, subangular, matrix-supported), clear smooth lower boundary. Late Pleistocene Jackson alluvium, A horizon.
Zone 2	21–74 cm	Brown (7.5YR 4/3, moist) clay loam, firm, moderate medium subangular blocky structure, 2 percent limestone gravels (granule-sized, subangular, matrix-supported), few krotovina, gradual smooth lower boundary. Late Pleistocene Jackson alluvium, B horizon.
Zone 3	74–127 cm	Brown (10YR 5/3, moist) clay loam, firm, moderate medium angular blocky structure, 20 percent limestone gravels (granule-sized, subrounded, matrix-supported), abrupt smooth lower boundary. Late Pleistocene Jackson alluvium, B2 horizon.
Zone 4	127+ cm	Lower Cretaceous Walnut Formation, R horizon.

Backhoe Trench 21, east wall

Zone 1	0–136 cm	Artificial fill.
Zone 2	136–157 cm	Very dark gray (10YR 3/1, moist) clay loam, very firm, strong fine angular blocky structure, 2 percent limestone gravels (granule-sized, subrounded, matrix-supported), very abrupt smooth lower boundary. Late Holocene West Range alluvium, A horizon.
Zone 3	157–228+ cm	Rounded, clast-supported gravels (granule- to pebble-sized), lower boundary not observed. Late Holocene West Range alluvium, C horizon.

Site 41BL1039-B

Test Unit 3, south wall

Zone 1	0–17 cm	Very dark grayish brown (10YR 3/2 moist) gravelly silty clay loam, friable, moderate coarse subangular blocky structure, 15 percent subrounded very coarse sand and limestone granules, abrupt smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	17–23 cm	Very dark grayish brown (10YR 3/2 moist) matrix-supported gravel lens, 35–60 percent subrounded limestone pebbles and granules, abrupt smooth boundary. Late Holocene Ford alluvium, C horizon.

Zone 3	23–54 cm	Very dark brown (10YR 2/1 moist) silty clay, friable, moderate fine angular blocky structure, <15 percent subangular limestone granule, abrupt smooth boundary. Late Holocene Ford alluvium, 2Ab horizon.
Zone 4	54–92 cm	Very dark gray (10YR 3/1 moist) silty clay loam, very friable, weak coarse subangular blocky parting to granular structure, <15 percent subrounded limestone granules, lower boundary not observed. Late Holocene Ford alluvium, 2C horizon.

Test Unit 4, south wall

Zone 1	0–9 cm	Very dark grayish brown (10YR 3/2 moist) gravelly silty clay, firm, moderate medium angular blocky structure, 15–35 percent subangular limestone granules and pebbles, clear smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	9–41 cm	Brown (10YR 4/3 moist) gravelly silty clay loam, firm, moderate coarse angular blocky structure, 15–35 percent subangular limestone granules, very abrupt smooth boundary. Late Holocene Ford alluvium, Bw horizon.
Zone 3	41–76 cm	Light gray (10YR 7/2 moist) clast-supported interbedded gravels (no orientation): 11-cm-thick beds of subrounded very coarse sand, limestone granules, pebbles, and shell fragments, 15-cm-thick beds of very coarse sand and granules, very abrupt smooth boundary. Late Holocene Ford alluvium, C horizon.
Zone 4	76–130 cm	Very pale brown (10YR 7/3 moist) interbedded subangular very coarse sand and granules, 8–10-cm-thick beds of subangular medium to coarse sand, abrupt smooth boundary. Late Holocene Ford alluvium, 2C horizon.
Zone 5	130–150 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam; massive; <15 percent subangular granules; lower boundary not observed. Late Holocene Ford alluvium, 3C horizon.

Test Unit 7, southwest wall

Zone 1	0–44 cm	Very dark grayish brown (10YR 3/2 moist) silty clay, firm, moderate coarse angular blocky structure, 15 percent subrounded granules and pebbles, few fine irregular carbonate masses, clear smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	44–69 cm	Very dark brown (10YR 2/2 moist) silty clay loam, firm, weak coarse subangular blocky structure, <15 percent subrounded very coarse sand and limestone cobbles, some burned, clear smooth boundary. Late Holocene Ford alluvium, 2Ab horizon.
Zone 3	69–94 cm	Dark gray (10YR 4/1 moist) silty clay loam, friable, weak coarse subangular blocky structure, lower boundary not observed. Late Holocene Ford alluvium, 2C horizon.

Backhoe Trench 14, west wall

Zone 1	0–25 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, friable, weak medium subangular blocky structure, <15 percent subangular limestone granules, clear smooth boundary. Late Holocene Ford alluvium, Ap horizon.

Zone 2	25–44 cm	Dark yellowish brown (10YR 3/4 moist) silty clay loam, firm, moderate coarse angular blocky structure, <15 percent subangular limestone granules and pebbles, abrupt smooth boundary. Late Holocene Ford alluvium, Bw horizon.
Zone 3	44–91 cm	Black (10YR 2/1 moist) gravelly silty clay loam, firm, weak medium subangular blocky structure, 15–35 percent subangular limestone granules and pebbles, fine common distinct clay cutans on ped faces, abrupt smooth boundary. Late Holocene Ford alluvium, 2Ab horizon.
Zone 4	91–144 cm	Very dark gray (10YR 3/1 moist) gravelly silty clay, firm, moderate coarse subangular blocky structure, 15–35 percent subangular to subrounded limestone pebbles and cobbles, clear smooth boundary. Late Holocene Ford alluvium, 2BC horizon.
Zone 5	144+ cm	Gray (10YR 5/1 moist) silty clay, firm, moderate coarse subangular blocky structure, medium common prominent light yellowish brown (10YR 5/8 moist) mottles, 15–35 percent subangular to subrounded limestone pebbles and cobbles lower boundary not observed. Late Holocene Ford alluvium, 3Cr horizon.

Backhoe Trench 17, west wall

Zone 1	0–30 cm	Very dark grayish brown (10YR 3/2 moist) very coarse sandy clay loam, friable, weak medium subangular blocky to coarse granular structure, 15–35 percent subrounded very coarse sand and limestone granules, clear smooth boundary. Late Holocene Ford alluvium, A1 horizon.
Zone 2	30–85 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, friable, weak coarse subangular blocky structure, <15 percent subrounded granules, very abrupt and wavy boundary. Late Holocene Ford alluvium, A2 horizon.
Zone 3	85–99 cm	Very pale brown (10YR 7/3 moist) matrix-supported gravel bed, very coarse loamy sand, massive, subrounded to subangular limestone cobbles, very abrupt wavy boundary. Late Holocene Ford alluvium, C horizon.
Zone 4	99–110 cm	Dark yellowish brown (10YR 4/4 moist) coarse sandy clay loam, friable, moderate coarse subangular blocky structure, lower boundary not observed. Late Holocene Ford alluvium, 2C horizon.

Backhoe Trench 21, west wall

Zone 1	0–22 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, friable, weak coarse parting to medium subangular blocky structure, <15 percent subrounded limestone pebbles, fragmented snail shells, abrupt smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	22–33 cm	Light olive brown (2.5Y 5/6 moist) clast supported subangular very coarse sand and limestone granules, common snail shell fragments, abrupt smooth boundary. Late Holocene Ford alluvium, C horizon.
Zone 3	33–67 cm	Very dark gray (10YR 3/1 moist) gravelly silty clay loam, moderate coarse to medium subangular blocky structure, 15–35 percent subangular very coarse sand and few granules, clear smooth boundary. Late Holocene Ford alluvium, Ab horizon.

Zone 4, 67–95 cm	Dark gray (10YR 4/1 moist) gravelly silty clay, moderate subangular blocky structure, medium common distinct clay cutans on bridges, 15–35 percent subrounded very coarse sand and limestone granules, clear smooth boundary. Late Holocene Ford alluvium, Btb horizon.
Zone 5 95+ cm	Gray (10YR 5/1 moist) gleyed clay, medium common distinct light olive brown mottles, lower boundary not observed. Late Holocene Ford alluvium, Cg horizon.

Backhoe Trench 23, north wall

Zone 1 0–60 cm	Very dark gray (10YR 3/1 moist) silty clay, friable, weak coarse subangular blocky parting to coarse granular structure, <15 percent subrounded limestone pebbles, very abrupt smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2 60–95 cm	Light olive brown (10YR 5/4 moist) silty clay, matrix-supported, subrounded to subangular limestone granules, pebbles and cobbles with common shell fragments, no orientation, carbonate clast coatings and weak cementation (Stage II), lower boundary not observed. Jackson alluvium, 2C horizon.

Backhoe Trench 25, north wall

Zone 1 0–80 cm	Black (10YR 2/1 moist) silty clay, wet and sticky, weak medium subangular blocky structure, clear smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2 80–125 cm	Black (10YR 2/1 moist) silty clay, massive, wet and sticky, lower boundary not observed. Late Holocene Ford alluvium, AC horizon.

Backhoe Trench 29, west wall

Zone 1 0–61 cm	Dark brown (10YR 3/3 moist) gravelly silty clay, friable, moderate coarse subangular blocky structure, 15–35 percent subangular limestone granules and pebbles, very abrupt smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2 61–102 cm	Gray (10YR 5/1 moist) gravelly silty clay and limestone bedrock, 35–60 percent subrounded limestone granules, pebbles, cobbles, with shell fragments, few fine irregular Fe+ nodules, common fine segregated carbonate filaments, lower boundary not observed. Decomposing bedrock and Late Holocene Ford alluvium, 2Cr horizon.

Backhoe Trench 30, west wall

Zone 1 0–15 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, very friable, weak medium subangular blocky parting to coarse granular structure, 15–35 percent subrounded limestone granules, clear smooth boundary. Late Holocene Ford alluvium, Ap horizon.
Zone 2 15–57 cm	Dark grayish brown (10YR 4/2 moist) gravelly silty clay loam, friable, weak coarse subangular blocky structure, 15–35 percent subrounded very coarse sand and granules, abrupt smooth boundary. Late Holocene Ford alluvium, Bw horizon.
Zone 3 57–114 cm	Dark grayish brown (10YR 4/2 moist) silty clay, firm, moderate coarse

		subangular blocky structure, 15–35 percent subrounded very coarse sand and limestone granules, <15 percent pebbles and cobbles, medium common distinct clay cutans on bridges, few fine carbonate nodules, abrupt smooth boundary. Late Holocene Ford alluvium, Btk horizon.
Zone 4	114+ cm	Gray (10YR 5/1 moist) silty clay matrix, subrounded to subangular limestone pebbles and cobbles, common distinct medium light olive brown (2.5Y 5/4 moist) mottles, slightly gleyed, lower boundary not observed. Weathered bedrock and clay, Cg horizon.

Backhoe Trench 31, west wall

Zone 1	0–30 cm	Very dark grayish brown (10YR 3/2 moist) silty clay loam, very friable, weak fine subangular blocky parting to coarse granular structure, <15 percent subrounded limestone granules, clear smooth boundary. Late Holocene Ford alluvium, A horizon.
Zone 2	30–42 cm	Dark grayish brown (10YR 4/2 moist) silty clay loam matrix-supported gravel bed, friable, weak fine granular structure, 35–60 percent subangular very coarse sand and limestone granules and pebbles, abrupt smooth boundary. Late Holocene Ford alluvium, C horizon.
Zone 3	42–67 cm	Black (10YR 2/1 moist) gravelly silty clay, firm, moderate coarse subangular blocky structure, 15–35 percent subangular coarse sand and limestone granules and pebbles, clear smooth boundary. Late Holocene Ford alluvium, Ab horizon.
Zone 4	67–90 cm	Very dark grayish brown (10YR 3/2 moist) silty clay, moderate coarse subangular blocky structure, firm, <15 percent subangular limestone granules, common fine distinct clay cutans on ped faces, common interlocking slickensides, clear smooth boundary. Late Holocene Ford alluvium, Btssb horizon.
Zone 5	90–100 cm	Gray (10YR 5/1 moist) weathered bedrock and clay, silty clay matrix, subrounded to subangular limestone pebbles and cobbles, common distinct medium light olive brown (2.5Y 5/4 moist) mottles, slightly gleyed, lower boundary not observed. Weathered bedrock, Cg horizon.

Site 41CV70-B

Backhoe Trench 1, south wall

Zone 1	0–35 cm	Very dark grayish brown (10YR 3/2, moist) clay loam, firm, moderate medium blocky angular structure, 2 percent limestone and chert gravels (subangular, matrix-supported, granule- to pebble-sized), clear smooth lower boundary. Late Holocene alluvium, A horizon.
Zone 2	35–152 cm	Dark grayish brown (10YR 4/2, moist) clay loam, firm, moderate medium prismatic parting to moderate medium blocky angular structure, common Fe and Mn concretions, few clay films on ped faces, 5 percent limestone and chert gravels (subangular, matrix-supported, granule- to pebble-sized, some highly weathered), clear smooth lower boundary. Late Holocene alluvium, Bw horizon.
Zone 3	152–206 cm	Grayish brown (10YR 5/2, moist) clay loam, firm, moderate medium

		prismatic parting to moderate medium blocky angular structure, common Fe and Mn concretions, few clay films on ped faces, 5 percent limestone and chert gravels (subangular, matrix-supported, granule- to pebble-sized, soft and weathered), abrupt smooth lower boundary. Late-Middle Holocene alluvium, Bw2 horizon.
Zone 4	206–221+ cm	Soft, highly weathered limestone bedrock. R horizon.

Backhoe Trench 3, south wall

Zone 1	0–41 cm	Black (2.5Y 2.5/1, moist) clay loam, very firm, moderate medium blocky angular structure, 2 percent limestone gravels (angular to subangular, matrix-supported, granule- to pebble-sized), few clay films on ped faces in the lower half of the zone, clear smooth lower boundary. Late Holocene colluvium and slopewash, A horizon.
Zone 2	41–81 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate medium prismatic parting to moderate medium blocky angular structure, 5 percent limestone and chert gravels (angular to subangular, matrix-supported, granule- to cobble-sized) increasing to 25 percent in lower half of zone, common clay films on ped faces, clear smooth to broken lower boundary. Late Holocene colluvium and slopewash, Bw horizon.
Zone 3	81–106+ cm	Weathered limestone bedrock, R horizon.

Site 41CV118-B

Backhoe Trench 1, south wall

Zone 1	0–44 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate fine blocky subangular structure, 10 percent limestone gravels (angular to subangular, matrix-supported, granule- to pebble-sized), abrupt smooth lower boundary. Late Holocene colluvium and slopewash, A horizon.
Zone 2	44–75 cm	Dark grayish brown (10YR 4/2, moist) very gravelly clay loam, firm, moderate medium blocky angular structure, 50 percent limestone gravels (matrix-supported, granule- to pebble-sized), abrupt smooth lower boundary. Late Holocene colluvium and slopewash, Bw horizon.
Zone 3	75–140+ cm	Light brownish gray (10YR 6/2, moist) clay loam, firm, moderate medium blocky angular structure, 5 percent limestone gravels (matrix-supported), one gravel stringer at 112 cm below surface, many prominent medium mottles (10YR 6/6, moist), few Mn nodules, lower boundary not observed. Late Pleistocene Jackson alluvium, 2Bb horizon.

Backhoe Trench 2, south wall

Zone 1	0–75 cm	Very dark grayish brown (10YR 3/2, moist) gravelly clay loam, firm, moderate fine blocky subangular structure, 25 percent limestone gravels (subrounded to rounded, granule- to cobble-sized) most in the form of two gravel beds dipping to the east at 31 and 58 cm below surface, abrupt smooth lower boundary. Late Holocene West Range alluvium, A horizon.
Zone 2	75–98 cm	Poorly sorted, clast-supported gravel bed, gravels are rounded to subrounded, interstices filled with fine-grained sediment of Zone 1, bed

dips to the east, abrupt smooth lower boundary. Late Holocene West Range alluvium, C horizon.

Zone 3 98–168+ cm Dark grayish brown (10YR 4/2, moist) gravelly sandy clay loam, friable, moderate fine blocky subangular structure, 25 percent limestone gravels (rounded to subrounded, granule- to cobble-sized) in the form of a bed that dips to the east at 138 cm below surface, lower boundary not observed. Late Holocene West Range alluvium, Ab horizon.

Backhoe Trench 6, south wall

Zone 1 0–40 cm Very dark grayish brown (10YR 3/2, moist) silty clay loam, friable, moderate fine blocky subangular structure, clear smooth lower boundary. Late Holocene Ford alluvium, A horizon.

Zone 2 40–89 cm Dark grayish brown (10YR 4/2, moist) clay loam, firm, moderate medium blocky angular structure, 10 percent limestone gravels (subangular to subrounded, matrix-supported, granule- to pebble-sized), few faint $CaCO_3$ filaments, clear smooth lower boundary. Late Holocene Ford alluvium, Bw horizon.

Zone 3 89–155 cm Moderately sorted clast-supported gravel bed, subrounded to rounded, interstices filled with pale brown (10YR 6/3, moist) sandy clay, gravel bed dips to the west, clear smooth lower boundary. Late Holocene West Range alluvium, C horizon.

Zone 4 155–250+ cm Dark grayish brown (10YR 4/2, moist) clay loam, firm, moderate coarse prismatic parting to moderate medium blocky angular structure, lower boundary not observed. Late Holocene West Range alluvium, 2ABb horizon.

Backhoe Trench 8, north wall

Zone 1 0–20 cm Very dark grayish brown (10YR 3/2, moist) clay loam, firm, weak fine granular structure, abrupt smooth lower boundary. Late Holocene Ford alluvium, A horizon.

Zone 2 20–88 cm Brown (10YR 5/3, moist) sandy clay, firm, structureless, interspersed sandy beds throughout the zone, abrupt smooth lower boundary. Late Holocene Ford alluvium, C horizon.

Zone 3 88–144+ cm Muddy sandy gravel, gravels are subrounded to rounded, lower boundary not observed. Late Holocene Ford alluvium, C2 horizon.

Backhoe Trench 9, east wall

Zone 1 0–40 cm Dark grayish brown (10YR 4/2, moist) clay loam, firm, moderate fine granular structure, sandy gravel bed at base of zone that dips to the south and pinches out to the north, abrupt smooth lower boundary. Late Holocene Ford alluvium, AC horizon.

Zone 2 40–122 cm Very dark grayish brown (10YR 3/2, moist) clay loam, firm, moderate fine blocky angular structure, 5 percent limestone gravels (subrounded, matrix-supported, granule- to pebble-sized), few faint $CaCO_3$ filaments, very abrupt smooth lower boundary. Late Holocene West Range alluvium, 2Ab horizon.

Zone 3	122–145 cm	Poorly sorted clast-supported gravels, subrounded to rounded, gravel bed dips to the north, abrupt smooth lower boundary. Late Holocene West Range alluvium, 2C horizon.
Zone 4	145–198+ cm	Very dark gray (10YR 3/1, moist) to grayish brown (10YR 5/2, moist) very gravelly sandy clay loam, moderate fine blocky angular structure, 50 percent limestone gravels (subrounded, granule- to cobble-sized) in form of gravel bed, texture changes to a clay loam below the gravel bed, lower boundary not observed. Late Holocene West Range alluvium, 3Ab horizon.

Backhoe Trench 10, south wall

Zone 1	0–24 cm	Very dark grayish brown (10YR 3/2, moist) clay loam, firm, moderate fine blocky angular structure, thin gravel bed at 24 cm below surface, gravels are rounded and clast-supported, abrupt smooth lower boundary. Late Holocene West Range alluvium, A horizon.
Zone 2	24–40 cm	Dark grayish brown (10YR 4/2, moist) silty clay loam, firm, moderate fine blocky angular structure, few faint $CaCO_3$ filaments, 2 percent limestone gravels (subrounded to rounded, matrix-supported, granule- to pebble-sized), abrupt smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.
Zone 3	40–107 cm	Horizontally bedded gravels, rounded, clast-supported, moderately-sorted, interstices filled with pale brown (10YR 6/3, moist) mud, abrupt smooth lower boundary. Late Holocene West Range alluvium, C horizon.
Zone 4	107–152 cm	Pale brown (10YR 6/3, moist) sandy clay loam, firm, moderate medium blocky angular structure, common distinct, medium mottles (10YR 6/6, moist), 10 percent limestone and chert gravels (subrounded to rounded, matrix-supported, granule- to pebble-sized), abrupt smooth lower boundary. Late Holocene West Range alluvium, Bwb horizon.
Zone 5	152–237+ cm	Pale brown (10YR 6/3, moist) sandy gravel, rounded gravels, lower boundary not observed. Late Holocene West Range alluvium, C horizon.

Backhoe Trench 11, northeast wall

Zone 1	0–60 cm	Dark gray (10YR 3/1, moist) clay loam, firm, moderate medium blocky subangular structure, 5 percent limestone gravels (subrounded, matrix-supported, granule- to pebble-sized), clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.
Zone 2	60–122 cm	Brown (10YR 5/3, moist) gravelly silty clay loam, firm, moderate fine blocky subangular structure, 25 percent limestone gravels (subrounded, matrix-supported and in stringers, granule- to cobble-sized), few faint $CaCO_3$ filaments, abrupt smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.
Zone 3	122–182+ cm	Upward-fining gravel bed, subrounded to rounded, clast-supported, interstices filled with Zone 2 material, lower boundary not observed. Late Holocene West Range alluvium, C horizon.

Site 41CV506-B

Test Unit 1, west wall

Zone 1 0–40 cm Black (10YR 2/1, moist) sandy clay loam, very firm, strong medium blocky angular structure, <5 percent limestone gravels (subrounded, granule-sized), clear smooth lower boundary. Late Holocene alluvium, A horizon.

Zone 2 40–68 cm Very dark grayish brown (10YR 3/2, moist) sandy clay loam, firm, moderate medium blocky angular structure, <5 percent limestone gravels (subrounded, granule-sized), clear smooth lower boundary. Late Holocene alluvium, Bw horizon.

Zone 3 68–90+ cm Dark brown (10YR 3/3, moist) sandy clay loam, firm, moderate medium blocky subangular structure, 15 percent limestone gravels (subangular, granule- to pebble-sized), lower boundary not observed. Late Holocene alluvium, Bw2 horizon.

Test Unit 3, north wall

Zone 1 0–38 cm Very dark gray (10YR 3/1, moist) silty clay loam, firm, moderate fine blocky angular structure, 5 percent limestone gravels (subangular, granule-sized), clear smooth lower boundary. Late Holocene alluvium, A horizon.

Zone 2 38–63+ cm Dark brown (10YR 3/3, moist) silty clay loam, firm, strong coarse blocky angular structure, 5 percent limestone gravels (subangular, granule- to pebble-sized), lower boundary not observed. Late Holocene alluvium, Bw horizon.

Test Unit 4, east wall

Zone 1 0–60 cm Black (10YR 2/1, moist) sandy clay loam (sand-sized carbonate clasts), firm, moderate fine blocky angular structure, <5 percent limestone gravels (subrounded, granule-sized), abrupt smooth lower boundary. Late Holocene alluvium, A horizon.

Zone 2 60–110 cm Very dark grayish brown (10YR 3/2, moist) gravelly to very gravelly sandy clay loam (sand-sized carbonate clasts), very friable, weak fine to medium blocky angular structure, 50 percent limestone gravels at 60–76 cm below surface (subangular, granule- to pebble-sized), 20 percent limestone gravels at 76–110 cm below surface (subangular, granule- to pebble-sized), clear smooth lower boundary. Late Holocene alluvium, B horizon.

Zone 3 110–122+ cm Brown (10YR 4/3, moist) gravelly sandy clay loam (sand-sized carbonate clasts), very friable, weak fine blocky subangular parting to coarse angular structure, 20 percent limestone gravels (subangular, matrix-supported, granule- to pebble-sized), lower boundary not observed. Late Holocene alluvium, Bw horizon.

Test Unit 7, south wall

Zone 1 0–30 cm Black (10YR 2/1, moist) silty clay loam, firm, moderate medium blocky angular structure, 15 percent limestone gravels (subangular, granule-sized), abrupt smooth lower boundary. Late Holocene alluvium, A horizon.

Zone 2 30–53 cm Black (10YR 2/1, moist) very gravelly silty clay loam, firm, structureless, 50 percent limestone gravels (subangular, granule- to pebble-sized, imbricated), abrupt smooth lower boundary. Late Holocene alluvium, A2 horizon.

Zone 3	53–85 cm	Gray (10YR 5/1, moist) gravelly silty clay loam, friable, weak coarse granular structure, 30 percent limestone gravels (subrounded, granule- to pebble-sized), abrupt wavy lower boundary. Late Holocene alluvium, B horizon.
Zone 4	85–97+ cm	Grayish brown (2.5Y 5/2, moist) silty clay loam (slightly more clay than Zone 3), very friable, weak fine blocky subangular parting to coarse granular structure, few faint fine mottles (7.5YR 5/6), 10 percent limestone gravels (subrounded, granule- to pebble-sized), lower boundary not observed. Late Holocene alluvium, Bw horizon.

Site 41CV580

Test Unit 3, north wall

Zone 1	0–17 cm	Disturbed fill.
Zone 2	17–67 cm	Very dark gray (10YR 3/1, moist) clay loam, firm, moderate fine blocky angular structure, 3 percent limestone gravels (matrix-supported, granule-sized), thin gravel bed at base of zone, few freshwater mussel shell fragments, few burned rocks, abrupt smooth lower boundary. Late Holocene colluvium and slopewash, A horizon.
Zone 3	67–112 cm	Very dark gray (10YR 3/1, moist) silty clay loam, firm, moderate medium blocky angular structure, 5 percent limestone gravels (matrix-supported, granule- to pebble-sized), common $CaCO_3$ filaments on ped faces, common burned rocks, few freshwater mussel shells, few pieces of charcoal, gradual smooth lower boundary. Late Holocene colluvium and slopewash, 2Ab horizon.
Zone 4	112–195 cm	Dark gray (10YR 4/1, moist) clay loam, firm, moderate fine blocky angular structure, 5 percent limestone gravels (matrix-supported, granule- to pebble-sized), many clay films on ped faces, clear smooth lower boundary. Late Holocene colluvium and slopewash, 2Bb horizon.
Zone 5	195–243 cm	Grayish brown (10YR 5/2, moist) clay loam, firm, moderate medium blocky angular structure, 5 percent limestone gravels (matrix-supported, granule- to pebble-sized), common burned rocks at base of zone, abrupt smooth lower boundary. Late Holocene colluvium and slopewash, 2Bwb horizon.
Zone 6	243–260+ cm	Dark gray (10YR 4/1, moist) clay loam, firm, moderate fine blocky angular structure, common clay films on ped faces, lower boundary not observed. Late Holocene Leon River paleosol/West Range alluvium, 3Ab horizon.

Backhoe Trench 1, east wall

Zone 1	0–69 cm	Very pale brown (10YR 7/3, moist) very fine to fine sand, very friable, structureless, horizontal laminated beds preserved throughout zone, thin mud laminae, abrupt smooth lower boundary. Late Holocene Ford alluvium, C horizon.
Zone 2	69–149 cm	Dark grayish brown (10YR 4/2, moist) silty clay loam, firm, moderate medium blocky subangular structure, thin very fine sand beds preserved

throughout the zone, thin gravel (granule-sized) bed at 103 cm below surface, gradual smooth lower boundary. Late Holocene Ford alluvium, AC horizon.

Zone 3 149–196 cm Dark grayish brown (10YR 4/2, moist) silty clay loam, friable, moderate medium blocky subangular structure, thin horizontal to contorted laminae of silts (10YR 7/3, moist) and muds (10YR 4/2, moist) preserved throughout the zone, gradual smooth lower boundary. Late Holocene Ford alluvium, C horizon.

Zone 4 196–271+ cm Dark grayish brown (10YR 4/2, moist) silty clay loam, friable, moderate medium blocky subangular structure, few krotovina filled with clayey (10YR 4/2, moist) material, thin laminae of silts (10YR 7/3, moist) and muds (10YR 4/2, moist) preserved throughout the zone, lower boundary not observed. Late Holocene Ford alluvium, C2 horizon.

Backhoe Trench 2, east wall

Zone 1 0–56 cm Very dark gray (10YR 3/1, moist) clay loam, firm, moderate fine blocky subangular structure, 5 percent limestone gravels (subangular, matrix-supported, granule- to pebble-sized), few burned rocks, few freshwater mussel shells, clear smooth lower boundary. Late Holocene colluvium and slopewash, A horizon.

Zone 2 56–150+ cm Very dark grayish brown (10YR 3/2, moist) gravelly clay loam, firm, moderate medium blocky subangular structure, 20 percent limestone gravels (angular to subangular, matrix-supported, granule- to pebble-sized), common clay films on ped faces, few burned rocks, few freshwater mussel shells, lower boundary not observed. Late Holocene colluvium and slopewash, Bw horizon.

Site 41CV669-B

Backhoe Trench 2, west wall

Zone 1 0–35 cm Very dark grayish brown (10YR 3/2, moist) silty clay loam, firm, moderate medium granular structure, 5 percent limestone and chert gravels (subangular to subrounded, matrix-supported, granule- to pebble-sized), clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.

Zone 2 35–107 cm Dark grayish brown (10YR 4/2, moist) gravelly clay loam, firm, moderate medium blocky angular structure, 20 percent limestone and chert gravels (subangular to rounded, matrix-supported, granule- to pebble-sized), few faint $CaCO_3$ filaments, abrupt smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.

Zone 3 107–178+ cm Sequence of three upward-fining gravel beds; clast-supported rounded gravels with no interstitial mud (107–126 cm), clast-supported rounded gravels with common interstitial mud and sand (126–146 cm), and clast-supported rounded gravels with common interstitial mud and sand (146–178+ cm), lower boundary not observed. Late Holocene West Range alluvium, C horizon.

Backhoe Trench 4, north wall

Zone 1 0–35 cm Very dark gray (10YR 3/1, moist) clay loam, firm, moderate medium granular structure, 10 percent limestone and chert gravels (subangular to subrounded, matrix-supported, granule- to pebble-sized), clear smooth lower boundary. Late Holocene West Range alluvium, A horizon.

Zone 2	35–65 cm	Dark grayish brown (10YR 4/2, moist) gravelly clay loam, firm, moderate medium blocky angular structure, 20 percent limestone and chert gravels (subangular to subrounded, matrix-supported, granule- to pebble-sized), abrupt smooth lower boundary. Late Holocene West Range alluvium, Bw horizon.
Zone 3	65–158+ cm	Grayish brown (10YR 5/2, moist) gravelly clay loam, firm, moderate medium blocky angular structure, 30 percent limestone and chert gravels (subangular to subrounded, granule- to pebble-sized) in the form of multiple stringers at 65–98 cm below surface, 15 percent limestone and chert gravels (subangular to subrounded, matrix-supported, granule- to pebble-sized) at 98–158+ cm below surface, lower boundary not observed. Late Holocene West Range alluvium, Bw2 horizon.

Site 41CV730-B

Backhoe Trench 1, east wall (south end)

Zone 1	0–33 cm	Brown (10YR 5/3, moist) very gravelly silt loam, friable, structureless, 50 percent limestone gravels (angular to subrounded, bedded, granule- to pebble-sized), abrupt smooth lower boundary. Recent slopewash, C horizon.
Zone 2	33–67 cm	Very dark grayish brown (10YR 3/2, moist) gravelly silty clay loam, firm, moderate medium blocky angular structure, 25 percent limestone gravels (subrounded, granule- to pebble-sized), clear smooth lower boundary. Late Holocene colluvium and slopewash, Ab horizon.
Zone 3	67–103 cm	Brown (7.5YR 4/4, moist) gravelly silty clay loam, firm, moderate medium blocky angular structure, 25 percent limestone gravels (subangular to subrounded, granule- to pebble-sized), few faint $CaCO_3$ filaments, gradual smooth lower boundary. Late Holocene colluvium and slopewash, Bwb horizon.
Zone 4	103–200+ cm	Mottled brown (7.5YR 5/4 to 4/4) silty clay loam, firm, moderate coarse prismatic parting to moderate medium blocky angular structure, 10 percent limestone gravels (subangular to subrounded, granule- to pebble-sized), lower boundary not observed. Late Holocene colluvium and slopewash, Bwb2 horizon.

Backhoe Trench 1, east wall (mid-section)

Zone 1	0–69 cm	Very dark gray (10YR 3/1, moist) silty clay loam, firm, moderate fine blocky angular structure, 5 percent limestone gravels (subrounded, granule- to pebble-sized), clear smooth lower boundary. Late Holocene alluvium, A horizon.
Zone 2	69–105 cm	Dark gray (10YR 4/1, moist) clay loam, firm, moderate medium blocky angular structure, 5 percent limestone gravels (subrounded, granule- to pebble-sized), clear smooth lower boundary. Late Holocene alluvium, AB horizon.
Zone 3	105–141 cm	Mottled brown (10YR 4/3, moist) and dark gray (10YR 4/1, moist) gravelly clay loam, firm, moderate medium blocky angular structure, 25 percent

		limestone gravels (subangular to subrounded, granule- to pebble-sized), abrupt smooth lower boundary. Late Holocene alluvium, B horizon.
Zone 4	141–171+ cm	Poorly sorted clast-supported gravels, lower boundary not observed. Late Holocene alluvium, C horizon.

Backhoe Trench 1, east wall (north end)

Zone 1	0–93 cm	Dark gray (10YR 4/1, moist) silty clay loam, firm, moderate medium blocky angular structure, 5 percent limestone gravels (subrounded, granule- to pebble-sized), clear smooth lower boundary. Late Holocene alluvium, A horizon.
Zone 2	93–178 cm	Dark gray (10YR 4/1, moist) gravelly clay loam, very firm, moderate medium blocky angular structure, 40–50 percent limestone and chert gravels (subangular to subrounded, granule- to cobble-sized) in the form of distinct stringers throughout the zone, clear smooth lower boundary. Late Holocene alluvium, AB horizon.
Zone 3	178–238 cm	Mottled brown (10YR 5/3, moist) and gray (10YR 5/1, moist) very gravelly clay loam, firm, moderate medium blocky angular structure, 50 percent limestone and chert gravels (subangular to subrounded, granule- to cobble-sized), clear smooth lower boundary. Late Holocene alluvium, B horizon.
Zone 4	238–295+ cm	Mottled brownish yellow (10YR 6/6, moist) and light gray (10YR 7/2) sandy clay loam, firm, moderate medium blocky angular structure, 10 percent limestone and chert gravels (subrounded, granule- to pebble-sized), lower boundary not observed. Late Holocene alluvium, BC horizon.

Backhoe Trench 2, south wall

Zone 1	0–66 cm	Dark gray (10YR 4/1, moist) silty clay loam, friable, moderate medium blocky angular structure, 5 percent limestone gravels (subrounded, granule- to pebble-sized), gradual smooth lower boundary. Late Holocene alluvium, A horizon.
Zone 2	66–117 cm	Grayish brown (10YR 5/2, moist) silty clay loam, friable, moderate coarse prismatic parting to moderate medium blocky angular structure, 1–5 percent limestone gravels (subrounded, granule- to pebble-sized), few faint $CaCO_3$ filaments, abrupt smooth lower boundary. Late Holocene alluvium, B horizon.
Zone 3	117–188 cm	Very dark gray (10YR 3/1, moist) to dark gray (10YR 4/1, moist) gravelly clay loam, firm, strong medium blocky angular structure, 20 percent limestone gravels (soft and weathered, granule- to pebble-sized), common clay films on ped faces, abrupt smooth lower boundary. Late Holocene alluvium, Bt horizon.
Zone 4	188–213+ cm	Mottled yellowish brown (10YR 5/4, moist) and gray (10YR 5/1, moist) very gravelly sandy clay loam, firm, moderate medium blocky angular structure, 50 percent limestone and chert gravels (subrounded, granule- to pebble-sized), lower boundary not observed. Late Holocene alluvium, BC horizon.

Site 41CV1434-B

Backhoe Trench 2, south wall

Zone 1	0–32 cm	Very dark gray (10YR 3/1, moist) gravelly sandy clay loam (sand-sized carbonate clasts), firm, moderate medium granular structure, 20 percent limestone gravels (subangular to subrounded, granule- to pebble-sized), common burned rocks, clear smooth lower boundary. Late Holocene alluvium, A horizon.
Zone 2	32–46 cm	Dark grayish brown (10YR 4/2, moist) gravelly sandy clay loam (sand-sized carbonate clasts), firm, moderate medium blocky subangular structure, 20 percent limestone gravels (subrounded, granule- to pebble-sized), abrupt wavy lower boundary. Late Holocene alluvium, Bw horizon.
Zone 3	46–98+ cm	Grayish brown (10YR 5/2, moist) very gravelly sandy clay loam (sand-sized carbonate clasts), firm, structureless, 50 percent limestone gravels (subrounded, granule- to cobble-sized), lower boundary not observed. Late Holocene alluvium, BC horizon.

Backhoe Trench 4, east wall

Zone 1	0–30 cm	Dark grayish brown (10YR 4/2, moist) sandy clay loam (sand-sized carbonate clasts), firm, moderate medium blocky subangular structure, 10 percent limestone gravels (subrounded, granule-sized), gradual smooth lower boundary. Late Holocene alluvium, A horizon.
Zone 2	30–68 cm	Brown (7.5YR 5/4, moist) sandy clay loam (sand-sized carbonate clasts), firm, moderate fine prismatic structure, 10 percent limestone gravels (subrounded, granule- to pebble-sized), few $CaCO_3$ filaments, clear smooth lower boundary. Late Holocene alluvium, Bw horizon.
Zone 3	68–110 cm	Brown (7.5YR 5/4, moist) sandy clay loam (sand-sized carbonate clasts), firm, moderate medium prismatic structure, 5 percent limestone gravels (subrounded, granule-sized), thin gravel bed at 105 cm below surface, few $CaCO_3$ filaments, abrupt broken lower boundary. Late Holocene alluvium, Bw2 horizon.
Zone 4	110+ cm	Clast-supported gravel bed. Late Holocene alluvium, C horizon.

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APPENDIX C: ANALYSIS OF VERTEBRATE FAUNAL REMAINS

Brian S. Shaffer

Faunal remains recovered from 11 sites (12 subareas) at Fort Hood were analyzed to identify the taxa represented, taphonomic condition of the remains, and unique attributes such as evidence of cultural modification or medical disorders. Samples from each of the sites are quite small, and few interpretations can be made about hunting practices and environments exploited. None of the taxa identified are unusual for the region. Tables C.1 and C.2 summarize the faunal assemblages by site, and Table C.3 presents detailed provenience data and identifications.

Faunal remains were tabulated using the number of identified specimens (NISP). This is simply the number of specimens identified to each taxonomic category (see Table C.1). Commonly used in conjunction with NISP, the minimum number of individuals (MNI) was calculated, but at each site, no more than one individual was identified per taxon, with the possible exception of artiodactyls at 41CV580. There is no duplication of unique elements at this site, but the age categories and specimen sizes indicate that at least two individuals may be represented. The younger specimen is represented by a metapodial shaft fragment. In artiodactyls, the third and fourth metapodials fuse together to form a single bone. This specimen, which represents just one of the metapodials before fusion with its counterpart, is aged as fetal or neonatal based on its small size. Other artiodactyl remains in the 41CV580 assemblage are from adult-sized animals.

The largest assemblage of faunal remains from a single site is from 41BL991-B, and it includes only four taxa: bison (includes *Bos-Bison* indeterminate), deer, rabbit, and vole. One element, a complete calcaneus that was unburned and markedly weathered, was positively identified as *Bison bison*. The *Bos-Bison* remains are those of lower leg elements and one cervical vertebra. Although these remains are too incomplete or nondescript to make identifications to more specific levels, their association with the calcaneus indicates that they are probably bison also. One artiodactyl tooth enamel fragment and scapula fragment also were recovered. This tooth fragment appears to be from a deer, although the small size of the specimen precludes further identification. The scapula fragment also appears to be deer-sized, but chemical dissolution and fragmentation allow identification only to the level of Order. Rabbit is represented by a tibia shaft fragment that contains the fibular attachment. The vole is represented by four teeth, but no comparative materials were available to narrow the identification further.

Presented in Table C.2 are the taphonomic findings from each site. Aside from breakage, most of the bone was recovered in relatively good condition. Weathering was not a significant factor, and none of the specimens are identified as having marked weathering attributes such as pronounced longitudinal fracturing or flaking in planes. Chemical etching is, however, noticeable on bones from several sites. This etching is limited to random, irregular, and spaced pitting along the surface. In some cases, the etching is quite marked and has affected all of the original exterior surfaces of the bone.

Broken bones were described as having angular or spirally fractured breaks. Angular fracturing occurs in skeletal elements such as flat bones of the pelvis, rib, sternum, scapula, or cranium of mammals and birds, as well as in elements such as turtle shell. These fractures may occur either when the bone is still fresh and contains collagen or after the bone has lost its collagen. Spiral fractures can occur in most tubular bones when they are fresh or contain collagen and may be associated with processing bone for marrow or grease but also may be caused by other processes such as carnivore gnawing. No definitive cultural or carnivore bone-breaking evidence was observed, however.

One interesting find attests to the good preservation at 41CV580 for fresh bone. A deer-sized artiodactyl metacarpal fragment from Test Unit 3 (Level 10) is still greasy. This means that the bone could still fracture in a spiral pattern because it had not lost all its collagen. The significance of this is that some bones retain their collagen long after the animals die (i.e., were used by humans). Subsequent spiral fractures could occur and would not be from cultural activities. As such, on individual specimens that exhibited no signs indicating the cause of breakage, the breakage pattern was simply recorded by type. Of the sites tested, however, it should be pointed out that 41CV580 has the highest percentage of spirally fractured bones with 27 percent (39 specimens) exhibiting this attribute. Such a high percentage of spirally fractured bone may indicate cultural processing of the bone.

Table C.1. Number of identified specimens (NISP) by site

Site	Taxon	NISP
41BL142-A	Aves (Duck sized or larger)	1
41BL231-B	Vertebrata (Vertebrates)	1
	Mammalia (Mouse/rat-sized)	1
	Mammalia (Canid/deer-sized)	13
	Didelphis virginiana (Opossum)	3
	Procyon lotor (Raccoon)	1
	Artiodactyla (Sheep/goat-sized)	2
	Artiodactyla (Deer-sized)	2
Subtotal		23
41BL231-D	Vertebrata (Vertebrates)	8
	Mammalia (Canid/deer-sized)	1
Subtotal		9
41BL43	Vertebrata (Vertebrates)	27
	Mammalia (Canid/Deer-sized)	41
	cf. *Didelphis virginiana* (Opossum)	1
	Rodentia (Rat-sized)	1
	Artiodactyla (Deer-sized)	2
	Odocoileus sp. (Deer)	1
Subtotal		73
41BL488-A	Vertebrata (Vertebrates)	5
	Mammalia (Canid/deer-sized)	4
	Artiodactyla (Deer-sized)	1
Subtotal		10
41BL490	Vertebrata (Vertebrates)	1
41BL491	Vertebrata (Vertebrates)	4
41BL589-B	Mammalia (Canid/deer-sized)	3
41BL991-B	Vertebrata (vertebrates)	308
	Mammalia (Canid/deer-sized)	29
	Mammalia (Deer/bison-sized)	1
	Leporidae	1
	Cricetidae (small vole)	4
	Artiodactyla (even-toed ungulates)	1
	Artiodactyla (Deer/pronghorn-sized ungulates)	1
	Bos/*Bison* (Cattle/bison)	6
	Bison bison (bison)	1
Subtotal		352
41CV1434-B	Vertebrata (Vertebrates)	1
41CV580	Vertebrata (Vertebrates)	75
	Testudinata (Turtle)	5
	Emydidae (Box and water turtles)	4
	Mammalia (Micro/small)	1
	Mammalia (Mouse/rabbit-sized)	1
	Mammalia (Canid/deer-sized)	33
	Sylvilagus sp. (Cottontail rabbit)	5
	Artiodactyla (Deer-sized)	17
	Odocoileus sp. (Deer)	1
Subtotal		142
41CV686-A	Vertebrata (Vertebrates)	6
	Mammalia (Canid/deer-sized)	3
	Artiodactyla (Deer-sized)	1
Subtotal		10
Total		629

The presence of parallel teeth marks on the bone's surface along edges of the bone is evidence of rodent gnawing. Although rodent gnawing was identified on bones from several sites, it does not appear to represent a severe deleterious process.

Burning was identified on specimens from several sites and is recorded in two manners. Bone that showed signs of charring (burned black) or less extensive brown discoloration from fire were identified as charred. This means that the specimens had endured incomplete combustion. Bones showing signs of being burned white were recorded as being calcined. Calcined bone has endured more-complete combustion, and the calcined bone stage precedes the stage at which the bone would be reduced to ash if the combustion continued.

Although most of the taxa identified are not unusual in prehistoric sites, the recovery of small artiodactyl bones from Shovel Test 3 (Level 1) in the rockshelter at 41BL231-B was unexpected. These remains appear to be from either subadult sheep or goats, both of which were introduced by Europeans during historic times. These two bones—and several others from the same shovel test and level—appear to be more recent (i.e., less weathered) than other recovered skeletal materials from the site. The presence of these taxa indicates that this level contains historic materials.

Several probable human bones were identified

Table C.2. Taphonomy of species by site

Site	Total Bones	Weathering		Breakage			Burning		Rodent Gnawing	Etching	
		Light	Marked	Unbroken	Angular	Spiral	Charred	Calcined		Light	Marked
41BL43	73	73	–	–	66	7	7	1	–	1	3
41BL142-A	1	1	–	–	1	–	–	–	–	1	–
41BL231-B	23	23	–	4	14	5	2	2	2	12	1
41BL231-D	9	9	–	–	9	–	1	–	–	–	–
41BL488-A	10	10	–	–	7	3	4	2	–	1	–
41BL490	1	1	–	–	1	–	–	–	–	–	–
41BL491	4	4	–	–	4	–	1	–	–	–	–
41BL589-B	3	3	–	–	–	3	1	2	–	3	–
41BL991-B	352	335	17	7	337	8	34	32	–	13	–
41CV580	142	142	–	4	99	39	11	4	6	–	–
41CV686-A	10	10	–	–	9	1	1	–	–	2	–
41CV1434-B	1	1	–	–	1	–	–	–	–	–	–
Totals	629	612	17	15	548	66	62	43	8	33	4

in the bone assemblage from rockshelter 41BL43 (Levels 1 and 2 of Test Unit 2). These remains were removed from the sample and returned to Prewitt and Associates. Subsequent examination confirmed that they are human skeletal elements.

Among the faunal remains submitted for analysis is a bone tool from 41CV580. It consists of a modified subadult deer ulna. Most of the shaft distal to the articular surfaces for the humerus was removed, then the end of the shaft was shaped into a dull, curved point. This type of bone artifact is not uncommon and is often referred to as a flint-knapping tool. Bell (1980:58–61) described this particular type of artifact as being a flaker. This modified specimen is not included in Tables C.1 or C.2, and it is described and tabulated as an artifact (see Chapter 6).

One final observation was made about the faunal assemblages. A canid- or deer-sized mammal longbone fragment from Test Unit 3 (Level 12) at 41CV580 shows evidence of a medical disorder known as periostitis, which is evidenced by porous and unevenly laid bone deposition on the surface of the bone. No cause for the condition could be determined.

Further work at these sites may reveal taxa or exploitation patterns not discerned from the small samples analyzed here. Site 41CV580 yielded the largest sample of faunal remains and shows the greatest promise for providing interpretable faunal data. Site 41BL43 did not yield a large faunal sample, but the potential presence of human remains indicates that a burial(s) probably is or was present in the rockshelter.

Table C.3. Provenience data and identifications of faunal remains

Site	Analysis Unit	No. of Specimens	Provenience	Feature	Flotation Sample	Taxon	Element	Portion	Side	Age	Weathering	Breakage	Gnawing	Burning	Chemical Etching	Comments
41BL43	--	4	Test Unit 2, 0-10 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 0-10 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral			Light	
41BL43	--	1	Test Unit 2, 0-10 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41BL43	--	15	Test Unit 2, 0-10 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 0-10 cm	--	--	Rodentia (Medium)	Tibia	Proximal portion of shaft	Right	Subadult	Light	Angular				
41BL43	--	1	Test Unit 2, 0-10 cm	--	--	Artiodactyla (Medium)	Tibia	Fragment			Light	Spiral				
41BL43	--	1	Test Unit 2, 0-10 cm	--	--	Odocoileus sp.	Proximal phalange	Proximal end			Light	Angular			Marked	
41BL43	--	3	Test Unit 2, 0-10 cm	--	--	cf. Homo sapiens sapiens	Rib	Fragment			Light	Angular				
41BL43	--	4	Test Unit 2, 10-20 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Calcined		
41BL43	--	1	Test Unit 2, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral			Marked	
41BL43	--	7	Test Unit 2, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL43	--	20	Test Unit 2, 10-20 cm	--	--	cf. Homo sapiens sapiens	Indeterminate	Fragment			Light	Angular				
41BL43	--	5	Test Unit 2, 10-20 cm	--	--	cf. Homo sapiens sapiens	Rib	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 10-20 cm	--	--	cf. Homo sapiens sapiens	Phalange	Complete			Light					
41BL43	--	1	Test Unit 2, 10-20 cm	--	--	cf. Homo sapiens sapiens	Long bone	Complete minus proximal epiphysis		Subadult	Light	Angular				
41BL43	--	4	Test Unit 2, 20-30 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL43	--	7	Test Unit 2, 20-30 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL43	--	7	Test Unit 2, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 20-30 cm	--	--	cf. Didelphis virginiana	Humerus	Distal portion of shaft	Right	Subadult	Light	Angular				
41BL43	--	5	Test Unit 2, 20-30 cm	--	--	cf. Homo sapiens sapiens	Indeterminate	Fragment			Light	Angular				
41BL43	--	9	Test Unit 2, 20-30 cm	--	--	cf. Homo sapiens sapiens	Rib	Shaft fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 20-30 cm	--	--	cf. Homo sapiens sapiens	Metapodial	Proximal end			Light	Angular				
41BL43	--	4	Test Unit 2, 30-40 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 30-40 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral			Marked	
41BL43	--	3	Test Unit 2, 30-40 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL43	--	2	Test Unit 2, 30-40 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Charred		
41BL43	--	3	Test Unit 2, 40-50 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 40-50 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 60-70 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL43	--	1	Test Unit 2, 60-70 cm	--	--	Artiodactyla (Medium)	Fused 3rd & 4th metatarsal	Fragment			Light	Spiral		Charred		
41BL43	--	1	Test Unit 2, 70-80 cm	--	--	Mammalia (Medium/large)	Costal cartilage	Shaft fragment			Light	Angular				
41BL142-A	--	1	Test Unit 2, 30-40 cm	--	--	Aves (Large)	Humerus	Distal end	Right		Light	Angular			Light	
41BL231-B	--	1	Shovel Test 3, 0-10 cm	--	--	Mammalia (Small/medium)	Rib	Vertebral end			Light	Angular			Light	
41BL231-B	--	2	Shovel Test 3, 0-10 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular			Light	

Table C.3, continued

Site	Analysis Unit	No. of Specimens	Provenience	Feature	Flotation Sample	Taxon	Element	Portion	Side	Age	Weathering	Breakage	Gnawing	Burning	Chemical Etching	Comments
41BL231-B	--	1	Shovel Test 3, 0-10 cm	--	--	Mammalia (Medium/large)	Sternum	Sternal body segment	Axial		Light	Angular			Light	
41BL231-B	--	4	Shovel Test 3, 0-10 cm	--	--	Mammalia (Medium/large)	Rib	Vertebral end			Light	Angular			Light	
41BL231-B	--	1	Shovel Test 3, 0-10 cm	--	--	Didelphis virginiana	Fibula	Complete shaft		Subadult	Light					
41BL231-B	--	1	Shovel Test 3, 0-10 cm	--	--	Artiodactyla	Patella	Complete			Light				Light	probable sheep/goat
41BL231-B	--	1	Shovel Test 3, 0-10 cm	--	--	Artiodactyla	Calcaneus	Complete minus proximal epiphysis	Left	Subadult	Light					probable sheep/goat
41BL231-B	--	1	Shovel Test 3, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular	Rodent			
41BL231-B	--	1	Shovel Test 3, 20-30 cm	--	--	Didelphis virginiana	Mandible	Ramus complete	Left		Light	Angular				
41BL231-B	--	1	Shovel Test 3, 20-30 cm	--	--	Didelphis virginiana	Permanent tooth	Lower PM			Light					
41BL231-B	--	1	Shovel Test 3, 20-30 cm	--	--	Artiodactyla (Medium)	Proximal phalange	Fragment			Light	Angular			Marked	
41BL231-B	--	1	Shovel Test 3, 30-40 cm	--	--	Procyon lotor	Ulna	Proximal portion of shaft	Left		Light	Angular	Rodent		Light	
41BL231-B	--	1	Test Unit 1, 10-20 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL231-B	--	1	Test Unit 1, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral			Light	
41BL231-B	--	1	Test Unit 1, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Calcined		
41BL231-B	--	1	Test Unit 1, 10-20 cm	--	--	Artiodactyla (Medium)	Fused 3rd & 4th metacarpal	Fragment			Light	Spiral			Light	
41BL231-B	--	1	Test Unit 1, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41BL231-B	--	1	Test Unit 1, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Charred		
41BL231-B	--	1	Test Unit 1, 40-47 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Calcined		
41BL231-D	--	1	Test Unit 3, 40-50 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL231-D	--	6	Test Unit 3, 40-50 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL231-D	--	1	Test Unit 3, 40-50 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL231-D	--	1	Test Unit 3, 40-50 cm	1	--	Mammalia (Medium/large)	Tooth	Fragment			Light	Angular				
41BL488-A	--	2	Test Unit 3, 0-10 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL488-A	--	2	Test Unit 3, 10-20 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL488-A	--	1	Test Unit 3, 10-20 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL488-A	--	1	Test Unit 3, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Charred		
41BL488-A	--	1	Test Unit 3, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Calcined		
41BL488-A	--	1	Test Unit 3, 10-20 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral			Light	
41BL488-A	--	1	Test Unit 3, 10-20 cm	--	--	Artiodactyla (Medium)	Carpal	Fragment			Light	Angular		Charred		
41BL488-A	--	1	Test Unit 3, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41BL490	--	1	Test Unit 2, 10-19 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL491	--	3	Test Unit 1, 40-45 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL491	--	1	Test Unit 1, 40-45 cm	--	--	Vertebrata	Long bone	Fragment			Light	Angular		Charred		
41BL589-B	--	2	Test Unit 1, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Calcined	Light	
41BL589-B	--	1	Test Unit 1, 20-30 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Charred	Light	

Table C.3, continued

Site	Analysis Unit	No. of Specimens	Provenience	Feature	Flotation Sample	Taxon	Element	Portion	Side	Age	Weathering	Breakage	Gnawing	Burning	Chemical Etching	Comments
41BL991-B	1	1	Backhoe Trench 23, 100 cm	--	--	*Bison bison*	Calcaneus	Complete	Right		Marked					
41BL991-B	2	1	Test Unit 2, 80-90 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41BL991-B	2	2	Test Unit 2, 90-100 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	3	Test Unit 2, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral		Charred		
41BL991-B	2	2	Test Unit 2, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	2	1	Test Unit 2, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	3	Test Unit 2, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular			Light	
41BL991-B	2	1	Test Unit 2, 90-100 cm	--	--	Artiodactyla	Tooth	Enamel fragment			Light	Angular				
41BL991-B	2	1	Test Unit 2, 90-100 cm	--	--	Artiodactyla (Medium)	Scapula	Glenoid fossa & incomplete blade	Right		Light	Angular			Light	
41BL991-B	2	1	Test Unit 2, 100-110 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	8	Test Unit 3, 90 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	1	Test Unit 3, 100-110 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular			Light	
41BL991-B	1	5	Test Unit 8, 80-90 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 8, 80-90 cm	--	--	*Bos/Bison*	Proximal sesamoid of forelimb	Complete	Left		Light					
41BL991-B	1	1	Test Unit 8, 92 cm	--	--	*Bos/Bison*	Fused central/fourth tarsal	Complete	Right		Light					
41BL991-B	1	3	Test Unit 8, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 8, 90-100 cm	--	--	*Bos/Bison*	Accessory carpal bone	Complete	Right		Light					
41BL991-B	1	1	Test Unit 8, 90-100 cm	--	--	*Bos/Bison*	Distal sesamoid	Complete			Light					
41BL991-B	1	2	Test Unit 8, 100-110 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	2	Test Unit 8, 100-110 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Marked	Angular				
41BL991-B	1	1	Test Unit 8, 100-110 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Marked	Spiral				
41BL991-B	1	1	Test Unit 8, 100-110 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41BL991-B	1	1	Test Unit 8, 100-110 cm	--	--	Bos/Bison	Radius	Diaphyseal fragment			Marked	Angular				
41BL991-B	1	1	Test Unit 8, 96 cm	--	--	Mammalia (Large/very large)	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 10, 70-80 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	1	Test Unit 10, 97 cm	--	--	*Bos/Bison*	Cervical vertebra	Fragment	Axial		Marked	Angular				
41BL991-B	1	9	Test Unit 10, 90-100 cm	--	--	Vertebrata	Indeterminate	Fragment			Marked	Angular				
41BL991-B	1	2	Test Unit 10, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Marked	Angular				
41BL991-B	1	1	Test Unit 2, 80-90 cm	--	1	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	6	Test Unit 2, 75-90 cm	--	7	Vertebrata	Indeterminate	Fragment			Light	Angular			Light	
41BL991-B	1	1	Test Unit 2, 75-90 cm	--	7	Vertebrata	Indeterminate	Fragment			Light	Spiral			Light	

Table C.3, continued

Site	Analysis Unit	No. of Specimens	Provenience	Feature	Flotation Sample	Taxon	Element	Portion	Side	Age	Weathering	Breakage	Gnawing	Burning	Chemical Etching	Comments
41BL991-B	1	4	Test Unit 2, 75-90 cm	--	7	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	1	Test Unit 2, 75-90 cm	--	7	Leporidae	Tibia	Fragment			Light	Spiral			Light	
41BL991-B	1	9	Test Unit 2, 75-93 cm	4	8	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	34	Test Unit 2, 75-93 cm	4	8	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 2, 75-93 cm	4	8	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	7	Test Unit 3, 80-90 cm	1	3	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	10	Test Unit 3, 80-90 cm	1	3	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	9	Test Unit 3, 80-90 cm	1	3	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	3	Test Unit 3, 82-91 cm	1	12	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	27	Test Unit 3, 82-91 cm	1	12	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	53	Test Unit 3, 82-102 cm	1	13	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	4	Test Unit 3, 82-102 cm	1	13	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	7	Test Unit 3, 82-102 cm	1	13	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	12	Test Unit 3, 85-95 cm	--	14	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 3, 85-95 cm	--	14	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	1	Test Unit 3, 85-95 cm	--	14	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	3	Test Unit 3, 87-95 cm	--	15	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	2	Test Unit 3, 87-95 cm	--	15	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	26	Test Unit 3, 92-102 cm	1	9	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	2	Test Unit 3, 92-102 cm	1	9	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	1	Test Unit 3, 92-102 cm	1	9	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	1	Test Unit 3, 92-102 cm	1	9	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	1	Test Unit 3, 92-102 cm	1	9	Cricetidae (Vole)	Permanent tooth	Cheek tooth			Light					
41BL991-B	1	1	Test Unit 3, 97-110 cm	1	10	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	1	Test Unit 3, 97-110 cm	1	10	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41BL991-B	1	31	Test Unit 3, 97-110 cm	1	10	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 3, 97-110 cm	1	10	Cricetidae (Vole)	Permanent	Cheek tooth			Light					
41BL991-B	1	13	Test Unit 3, 106-112 cm	1	11	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	1	1	Test Unit 3, 106-112 cm	1	11	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	2	Test Unit 3, 106-112 cm	1	11	Cricetidae (Vole)	Permanent tooth	Cheek tooth			Light	Angular				
41BL991-B	1	4	Test Unit 3, 100-110 cm	1	16	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41BL991-B	1	7	Test Unit 3, 100-110 cm	1	16	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	1	Test Unit 4, 45-70 cm	2	4	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	1	Test Unit 4, 52-62 cm	--	5	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	3	Test Unit 5, 90-100 cm	--	2	Vertebrata	Indeterminate	Fragment			Light	Angular				
41BL991-B	2	1	Test Unit 5, 90-100 cm	--	2	Vertebrata	Indeterminate	Fragment			Light	Angular		Calcined		
41CV580	1	2	Test Unit 2, 50-60 cm	--	--	Artiodactyla (Medium)	Tibia	Fragment			Light	Spiral				
41CV580	2	1	Test Unit 3, 10-20 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		

Table C.3, continued

Site	Analysis Unit	No. of Specimens	Provenience	Feature	Flotation Sample	Taxon	Element	Portion	Side	Age	Weathering	Breakage	Gnawing	Burning	Chemical Etching	Comments
41CV580	2	1	Test Unit 3, 10-20 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	2	1	Test Unit 3, 10-20 cm	--	--	Emydidae	Peripheral	Fragment			Light	Angular				
41CV580	2	1	Test Unit 3, 20-30 cm	--	--	Testudinata	Shell	Fragment			Light	Angular				
41CV580	2	1	Test Unit 3, 30-40 cm	--	--	Artiodactyla (Medium)	Proximal phalange	Distal end			Light	Spiral				
41CV580	2	2	Test Unit 3, 40-50 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	2	1	Test Unit 3, 40-50 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41CV580	2	1	Test Unit 3, 40-50 cm	--	--	Artiodactyla (Medium)	Metapodial	Fragment			Light	Spiral				
41CV580	3	1	Test Unit 3, 70-80 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	3	1	Test Unit 3, 70-80 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	3	1	Test Unit 3, 80-90 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral	Rodent			
41CV580	3	1	Test Unit 3, 80-90 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	3	8	Test Unit 3, 90-100 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Mammalia (Small/medium)	Rib	Fragment			Light	Angular				
41CV580	3	5	Test Unit 3, 90-100 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	3	3	Test Unit 3, 90-100 cm	--	--	Mammalia (Medium/large)	Rib	Fragment			Light	Angular		Charred		
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Sylvilagus sp.	Permanent tooth	Upper PM2	Left		Light	Angular				
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Artiodactyla (Medium)	Mandible	Horizontal ramus with diastema			Light	Angular				
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Artiodactyla (Medium)	Tibia	Distal lateral end			Light	Spiral				
41CV580	3	2	Test Unit 3, 90-100 cm	--	--	Artiodactyla (Medium)	Metapodial	Diaphyseal fragment			Light	Spiral				
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Artiodactyla (Medium)	Metapodial	Fragment		Fetal/ Neonatal	Light	Angular				
41CV580	3	1	Test Unit 3, 90-100 cm	--	--	Artiodactyla (Medium)	Fused 3rd & 4th metacarpal	Diaphyseal fragment			Light	Spiral				still greasy
41CV580	3	1	Test Unit 3, 100-110 cm	--	--	Emydidae	Nuchal	Fragment	Axial		Light	Angular				
41CV580	4	1	Test Unit 3, 110-120 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	4	1	Test Unit 3, 110-120 cm	--	--	Mammalia (Medium/large)	Long bone	Fragment			Light	Spiral				periostitis
41CV580	4	1	Test Unit 3, 110-120 cm	--	--	Artiodactyla (Medium)	Axis	Fragment	Axial		Light	Angular		Charred		
41CV580	4	1	Test Unit 3, 110-120 cm	--	--	Odocoileus sp.	Distal phalange	Complete			Light					
41CV580	4	12	Test Unit 3, 120-130 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	4	1	Test Unit 3, 120-130 cm	--	--	Emydidae	Plastron	Fragment			Light	Angular		Charred		
41CV580	4	3	Test Unit 3, 120-130 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	4	1	Test Unit 3, 120-130 cm	--	--	Artiodactyla (Medium)	Humerus	Distal end	Right		Light	Spiral	Rodent			
41CV580	4	1	Test Unit 3, 120-130 cm	--	--	Artiodactyla (Medium)	Femur	Fragment			Light	Spiral				
41CV580	4	1	Test Unit 3, 120-130 cm	--	--	Artiodactyla (Medium)	Metapodial	Fragment			Light	Spiral	Rodent			
41CV580	4	2	Test Unit 3, 130-140 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Spiral	Rodent			

Table C.3, continued

Site	Analysis Unit	No. of Specimens	Provenience	Feature	Flotation Sample	Taxon	Element	Portion	Side	Age	Weathering	Breakage	Gnawing	Burning	Chemical Etching	Comments
41CV580	4	2	Test Unit 3, 130-140 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	4	1	Test Unit 3, 130-140 cm	--	--	Vertebrata	Indeterminate	Fragment			Light	Spiral				
41CV580	4	4	Test Unit 3, 130-140 cm	--	--	Testudinata	Shell	Fragment			Light	Angular				
41CV580	4	1	Test Unit 3, 130-140 cm	--	--	Emydidae	Peripheral	Fragment			Light	Angular				cf. box turtle
41CV580	4	6	Test Unit 3, 130-140 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	4	2	Test Unit 3, 130-140 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Calcined		
41CV580	4	1	Test Unit 3, 130-140 cm	--	--	Artiodactyla (Medium)	Fused 3rd & 4th metacarpal	Fragment			Light	Spiral		Calcined		
41CV580	4	1	Test Unit 3, 130-140 cm	--	--	Artiodactyla (Medium)	Proximal phalange	Distal end			Light	Spiral	Rodent			
41CV580	4	1	Test Unit 3, 130-140 cm	--	--	Artiodactyla (Medium)	Middle phalange	Distal end			Light	Spiral				
41CV580	4	1	Test Unit 3, 150-160 cm	--	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Calcined		
41CV580	5	5	Test Unit 2, 172-181 cm	4	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	3	30	Test Unit 3, 88-103 cm	3	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	3	3	Test Unit 3, 88-103 cm	3	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41CV580	3	1	Test Unit 3, 88-103 cm	3	--	Mammalia (Micro/small)	Permanent tooth	Incisor			Light	Angular				
41CV580	3	2	Test Unit 3, 88-103 cm	3	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41CV580	3	1	Test Unit 3, 88-103 cm	3	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular		Charred		
41CV580	3	3	Test Unit 3, 88-103 cm	3	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral				
41CV580	3	1	Test Unit 3, 88-103 cm	3	--	Sylvilagus sp.	Mandible	Horizontal ramus with diastema	Left		Light	Angular				
41CV580	3	1	Test Unit 3, 88-103 cm	3	--	Sylvilagus sp.	Permanent tooth	Lower M1	Left		Light					
41CV580	3	1	Test Unit 3, 88-103 cm	3	--	Sylvilagus sp.	Permanent tooth	Lower M2	Left		Light					
41CV580	3	1	Test Unit 3, 88-103 cm	3	--	Sylvilagus sp.	Permanent tooth	Lower PM4	Left		Light					
41CV580	5	4	Test Unit 1, 145-156 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV580	5	1	Test Unit 1, 145-156 cm	1	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41CV580	5	2	Test Unit 2, 173-181 cm	4	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV686-A	--	4	Test Unit 1, 30-40 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
41CV686-A	--	1	Test Unit 1, 30-40 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular		Charred		
41CV686-A	--	2	Test Unit 1, 30-40 cm	1	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Angular				
41CV686-A	--	1	Test Unit 1, 40-50 cm	1	--	Artiodactyla (Medium)	Pelvis	Fragment			Light	Angular				
41CV686-A	--	1	Test Unit 1, 50-57 cm	1	--	Vertebrata	Indeterminate	Fragment			Light	Angular			Light	
41CV686-A	--	1	Test Unit 1, 50-57 cm	1	--	Mammalia (Medium/large)	Indeterminate	Fragment			Light	Spiral			Light	
41CV1434-B	--	1	Test Unit 1, 11-53 cm	2	--	Vertebrata	Indeterminate	Fragment			Light	Angular				
Total		552														

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APPENDIX D: ANALYSIS OF INVERTEBRATE FAUNAL REMAINS

Karen M. Gardner

During the 2000–2001 season, unmodified mussel shells were recovered from 8 sites and from 12 components within those sites. Mussel shells were recovered from 5 of the 7 rockshelters and from 3 of the 12 open campsites. Although mussel shells are common in rockshelters, the largest single occurrence of shells was from 41CV580, an open campsite/burned rock midden located on the Leon River, with a total of 668 specimens representing 88 percent of all of the shells recovered (Table D.1). Half of the shells from 41CV580 (n = 337; 50.4 percent) are associated with Analysis Unit 2, a Toyah phase component. Seven modified shells also were recovered; 4 from 41BL488-A (a rockshelter) and 3 from 41CV580 (Table D.2). These artifacts are discussed in Chapter 6.

Only complete valves and umbo fragments were collected in the field because they are an accurate representation of the type and quantity of shells at a site. A total of 760 valves and umbo fragments was recovered from the eight sites, as detailed in Table D.1. During analysis, each valve or umbo fragment was examined for evidence of modification and for identification of genus and species. Of the shells collected, 583 (77 percent) were identified to either the genus and species level or to the genus level. It was not possible to identify all of the shells because some were fragmentary, poorly preserved, or damaged to the umbo region. All of the identified invertebrate fauna belong to the family Unionidae, with *Amblema plicata* the most common species represented in the sample (n= 317; 42 percent). Detailed provenience information and genus and species identifications for all unmodified mussel shells are presented in Table D.4.

Table D.1. Summary of unmodified mussel shells

Site	Analysis Unit	Site Type	Number of Shells
41BL43	–	Rockshelter	18
41BL231-B	–	Rockshelter	1
41BL231-D	–	Open campsite	21
41BL488-A	–	Rockshelter	27
41BL491	–	Rockshelter	7
41BL589-B	–	Rockshelter	17
41BL991-B	2	Open campsite	1
41CV580	1	Open campsite	25
	2	Open campsite	337
	3	Open campsite	68
	4	Open campsite	132
	5	Open campsite/burned rock midden	106
Total			760

Table D.2. Summary of modified shell artifacts

Site	Analysis Unit	Provenience	Description
41BL488-A	–	Test Unit 1 (10–20 cm)	unidentified shell, disk bead
	–	Test Unit 3 (0–10 cm)	unidentified marine shell, columella bead
	–	Test Unit 3 (10–20 cm)	*Quadrula* sp., cut mussel valve
	–	Test Unit 3 (20–30 cm)	*Quadrula* sp., cut mussel valve
41CV580	1	Test Unit 2 (60–70 cm)	*Amblema plicata*, cut mussel valve
	2	Test Unit 3 (40–50 cm)	*Quadrula* sp., cut mussel valve
	2	Test Unit 3 (50–60 cm)	*Lampsilis teres*, cut mussel valve

Table D.3. Summary of identified species of mussel shells

Identification	Number	Percent	Family
Amblema apiculata	4	0.5	Unionidae
Amblema plicata	317	41.7	Unionidae
Lampsilis teres	12	1.6	Unionidae
Leptodea fragilis	18	2.4	Unionidae
Potamilus purpuratus	27	3.6	Unionidae
Quadrula apiculata	19	2.5	Unionidae
Quadrula houstonensis	54	7.1	Unionidae
Quadrula petrina	73	9.6	Unionidae
Quadrula sp.	12	1.6	Unionidae
Quincuncina mitchelli	14	1.8	Unionidae
Tritogonia verrucosa	32	4.2	Unionidae
unidentified	178	23.4	Unionidae
Totals	760	100.0	

Table D.4. Provenience and identification of unmodified mussel shells

Provenience	No. of Specimens	Identification	Description
41BL43, ANALYSIS UNIT 1			
Test Unit 2 (0–10 cm)	2	unidentified	umbo fragments, too small to identify
Test Unit 2 (10–20 cm)	1	*Amblema plicata*	nearly complete valve, posterior margin broken
	1	*Leptodea fragilis*	partial valve with umbo
	4	unidentified	umbo fragments, too small to identify
Test Unit 2 (20–30 cm)	1	*Tritogonia verrucosa*	umbo fragment
	1	*Quadrula* sp. (possibly *Q. houstonensis)*	nearly complete valve, ventral margin broken
	3	unidentified	umbo fragments, too small to identify
Test Unit 2 (30–40 cm)	1	*Quadrula* sp.	large umbo fragment, poor preservation
Test Unit 2 (40–50 cm)	1	*Amblema plicata*	partial valve with umbo
	2	*Lampsilis teres*	1 complete valve, 1 small partial valve with umbo
Test Unit 2 (60–70 cm)	1	*Amblema plicata*	partial valve with umbo, posterior portion broken
Subtotal	18		
41BL231-B, ANALYSIS UNIT 1			
Test Unit 1 (10–20 cm)	1	*Lampsilis teres*	nearly complete valve, broken along posterior ventral margin
41BL231-D, ANALYSIS UNIT 1			
Test Unit 3 (0–10 cm)	3	*Amblema plicata*	2 umbo fragments, 1 partial valve with umbo
Test Unit 3 (10–20 cm)	6	*Amblema plicata*	partial valves with umbos
	1	*Quadrula apiculata*	umbo fragment
	2	*Quadrula* sp.	1 umbo fragment, 1 partial valve with umbo
Test Unit 3 (20–30 cm)	2	*Amblema plicata*	2 partial valves with umbos
Test Unit 3 (30–40 cm), Feature 1	3	*Amblema plicata*	partial valves with umbos
	2	unidentified	umbo fragments, too fragmentary to identify
Test Unit 3 (60–70 cm)	1	unidentified	umbo fragment, covered with concretion
Test Unit 3 (100–110 cm)	1	unidentified	umbo fragment, poor condition
Subtotal	21		

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
41BL488-A, ANALYSIS UNIT 1			
Test Unit 1 (10–20 cm)	1	unidentified	umbo fragment, too small to identify
Test Unit 2 (0–10 cm)	3	unidentified	umbo fragments, too small to identify
Test Unit 3 (0–10 cm)	3	*Quadrula houstonensis*	nearly complete valves with umbos
	4	*Amblema plicata*	nearly complete valves with umbos
	6	unidentified	umbo fragments, too fragmentary to identify
Test Unit 3 (10–20 cm)	3	*Amblema plicata*	partial valves with umbos
	1	*Potamilus purpuratus*	nearly complete valve
	6	unidentified	umbo fragments, too small to identify
Subtotal	27		
41BL491, ANALYSIS UNIT 1			
Test Unit 1 (10–20 cm)	1	*Tritogonia verrucosa*	umbo fragment
	1	*Amblema plicata*	partial valve with umbo fragment
	1	unidentified	umbo fragment, weathered
Test Unit 1 (20–30 cm)	1	*Amblema plicata*	umbo fragment
	2	unidentified	umbo fragments, too fragmentary to identify
Test Unit 1 (30–40 cm)	1	unidentified	umbo fragment, too fragmentary to identify
Subtotal	7		
41BL991-B, ANALYSIS UNIT 2			
Test Unit 3 (82–102 cm), Feature 1	1	*Leptodea fragilis*	very small partial valve with umbo
41CV580, ANALYSIS UNIT 1			
Test Unit 2 (40–50 cm)	5	*Amblema plicata*	partial to nearly complete valves
	1	*Quadrula* sp.	partial valve
	1	unidentified	umbo fragment, too small/fragmentary to identify
Test Unit 2 (50–60 cm)	4	*Amblema plicata*	partial valves
	3	*Tritogonia verrucosa*	partial valves, nearly complete valve
	1	*Quadrula apiculata*	nearly complete valve
	1	*Quincuncina mitchelli*	nearly complete valve

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
	1	*Leptodea fragilis*	complete valve
	1	*Quadrula houstonensis* (?)	complete valve
Test Unit 2 (60–70 cm)	1	*Amblema plicata*	umbo fragment
	1	*Quincuncina mitchelli*	partial valve
	1	*Quadrula houstonensis* (?)	complete valve
Test Unit 2 (70–80 cm)	1	*Amblema plicata*	partial valve
Test Unit 2 (80–90 cm)	1	*Amblema plicata*	partial valve
	2	unidentified	umbo fragments, too small/fragmentary to identify
Subtotal	25		
41CV580, ANALYSIS UNIT 2			
Test Unit 3 (20–30 cm)	1	*Amblema plicata*	partial valve with umbo
	1	unidentified	umbo fragment, too small to identify
Test Unit 3 (30–40 cm)	16	*Amblema plicata*	umbo fragments, partial valves with umbos
	3	*Potamilus purpuratus*	1 umbo fragment, 2 complete valves
	2	*Quadrula apiculata*	1 partial valve with umbo, 1 complete valve
	10	*Quadrula petrina*	umbo fragments, complete valves
	1	*Lampsilis teres*	nearly complete valve
	4	unidentified	umbo fragments, too fragmentary to identify
Test Unit 3 (40–50 cm)	71	*Amblema plicata*	umbo fragments, complete valves
	13	*Potamilus purpuratis*	nearly complete valves with umbos
	4	*Amblema apiculata*	nearly complete valves, complete valves
	5	*Leptodea fragilis*	nearly complete valves, complete valves
	2	*Lampsilis teres*	nearly complete valves
	2	*Tritogonia verrucosa*	nearly complete valves
	19	*Quadrula petrina*	umbo fragments, nearly complete valves, complete valves
	26	*Quadrula houstonensis*	umbo fragments, nearly complete valves, complete valves
	3	*Quincuncina mitchelli*	nearly complete valves, complete valve
	19	unidentified	umbo fragments, too small/fragmentary to identify
	2	unidentified	psuedocardinal teeth, too small to identify (FS #2)
Test Unit 3 (50–60 cm)	88	*Amblema plicata*	umbo fragments, partial to nearly complete valves, complete valves
	2	*Quadrula apiculata*	umbo fragment, nearly complete valve

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
	13	*Quadrula houstonensis* (?)	partial to nearly complete valves
	4	*Quadrula petrina*	nearly complete valves, complete valves
	1	*Tritogonia verrucosa*	nearly complete valve
	2	*Quincuncina mitchelli*	nearly complete valve, complete valve
	5	*Leptodea fragilis*	nearly complete to complete valves
	2	*Lampsilis teres*	nearly complete valves
	1	*Potamilus purpuratus*	partial valve
	8	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 3 (60–70 cm)	3	*Amblema plicata*	2 umbo fragments, 1 nearly complete valve
	1	*Tritogonia verrucosa*	nearly complete valve
	2	*Quadrula apiculata*	nearly complete valves
	1	*Quadrula houstonensis* (?)	complete valve
Subtotal	337		
41CV580, ANALYSIS UNIT 3			
Test Unit 3 (70–80 cm)	1	*Tritogonia verrucosa*	nearly complete valve
	1	unidentified	psuedocardinal tooth fragment, too small to identify
Test Unit 3 (80–90 cm)	2	*Amblema plicata*	partial valves
	1	*Quadrula petrina*	nearly complete valve
Test Unit 3 (90–100 cm)	14	*Amblema plicata*	umbo fragments, partial valves (2 from FS #5)
	3	*Tritogonia verrucosa*	partial valves
	7	*Quadrula petrina*	partial to nearly complete valves
	3	*Quadrula houstonensis*	nearly complete valves
	1	*Leptodea fragilis*	nearly complete valve
	1	*Lampsilis teres*	complete valve
	3	*Quincuncina mitchelli*	partial valves
	5	unidentified	umbo fragments, too small/fragmentary to identify (1 from FS #5)
Test Unit 3 (100–110 cm)	8	*Amblema plicata*	umbo fragments, nearly complete valves
	1	*Tritogonia verrucosa*	umbo fragment
	6	*Quadrula petrina*	umbo fragments
	2	*Potamilus purpuratus*	umbo fragment, nearly complete valve
	5	unidentified	umbo fragments, too small/fragmentary to identify

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
Test Unit 3 (88–103 cm), Feature 3	1	*Amblema plicata*	partial valve (FS #6)
	1	*Quadrula petrina*	partial valve (FS #6)
	2	unidentified	umbo fragments, too small/fragmentary to identify (FS #6)
Subtotal	68		
41CV580, ANALYSIS UNIT 4			
Test Unit 3 (110–120 cm)	12	*Amblema plicata*	umbo fragments, nearly complete valves
	2	*Quadrula apiculata*	1 nearly complete valve, 1 complete valve
	2	*Quadrula houstonensis*	nearly complete valves
	4	*Quadrula petrina*	2 nearly complete valves, 2 complete valves
	5	*Tritogonia verrucosa*	partial valves, complete valves
	2	*Potamilus purpuratus*	complete valves
Test Unit 3 (110–120 cm)	1	*Lampsilis teres*	complete valve
	1	*Leptodea fragilis*	complete valve
	2	*Quincuncina mitchelli*	nearly complete valves
	5	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 3 (120–130 cm)	22	*Amblema plicata*	umbo fragments, nearly complete valves, complete valves
	1	*Tritogonia verrucosa*	partial valve
	1	*Quadrula apiculata*	complete valve
	8	*Quadrula petrina*	partial valves
	2	*Quadrula houstonensis*	complete valves
	2	*Lampsilis teres*	1 nearly complete valve, 1 complete valve
	5	*Potamilus purpuratus*	partial valves, nearly complete valves
	2	*Leptodea fragilis*	1 partial valve, 1 complete valve
	5	unidentified	umbo fragments, too small to identify
Test Unit 3 (130–140 cm)	10	*Amblema plicata*	umbo fragments, nearly complete valves, complete valves
	2	*Tritogonia verrucosa*	umbo fragments
	1	*Quincuncina mitchelli*	nearly complete valve
	3	*Quadrula petrina*	complete valves
	3	unidentified	umbo fragments, too small to identify
Test Unit 3 (140–150 cm)	7	*Amblema plicata*	umbo fragments, nearly complete valves, complete valves
	3	*Quadrula petrina*	nearly complete valves
	3	*Tritogonia verrucosa*	umbo fragment, partial valve, complete valve

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
	1	*Quincuncina mitchelli*	partial valve
	3	unidentified	umbo fragments, too small to identify
Test Unit 3 (150–160 cm)	4	*Amblema plicata*	2 umbo fragments, 2 nearly complete valves
	3	*Quadrula petrina*	umbo fragments
	2	*Quadrula houstonensis* (?)	nearly complete valves
Test Unit 3 (160–170 cm)	1	*Amblema plicata*	umbo fragment
	1	unidentified	umbo fragment, too small to identify
Test Unit 3 (210–220 cm)	1	unidentified	umbo fragment, too small to identify
Subtotal	132		
41CV580, ANALYSIS UNIT 5			
Test Unit 1 (130–140 cm)	1	unidentified	psuedocardinal tooth fragment, too small to identify
Test Unit 1 (140–150 cm)	2	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 1 (140–160 cm), Feature 1	3	*Amblema plicata*	umbo fragments
	3	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 1 (160–178 cm), Feature 1	7	*Amblema plicata*	umbo fragments
	1	*Leptodea fragilis*	partial valve
	2	*Tritogonia verrucosa*	umbo fragment, nearly complete valve
	2	*Quadrula apiculata*	umbo fragments
	7	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 2 (90–100 cm)	1	*Amblema plicata*	umbo fragment
	2	unidentified	umbo fragments
Test Unit 2 (100–110 cm)	7	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 2 (110–120 cm)	2	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 2 (140–150 cm)	3	*Amblema plicata*	umbo fragments
	1	unidentified	umbo fragment, too small/fragmentary to identify
Test Unit 2 (150–160 cm)	3	*Quadrula petrina*	umbo fragments
	1	*Quadrula apiculata*	partial valve
	1	*Tritogonia verrucosa*	umbo fragment
	10	unidentified	umbo/psuedocardinal tooth fragments, too small/fragmentary to identify

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
Test Unit 2 (160–170 cm)	1	*Quadrula apiculata*	partial valve
	1	*Tritogonia verrucosa*	umbo fragment
	2	*Quadrula* sp.	umbo fragments
	7	unidentified	umbo/psuedocardinal tooth fragments, too small/fragmentary/ weathered to identify
Test Unit 2 (170–180 cm)	1	*Amblema plicata*	partial valve
	1	*Tritogonia verrucosa*	umbo fragment in 2 pieces
	1	unidentified	umbo fragment, too small/fragmentary to identify
Test Unit 2 (180–190 cm)	6	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 2 (190–200 cm)	1	*Quadrula* sp.	umbo fragment
Test Unit 2 (136–140 cm)	2	unidentified	umbo fragments, too weathered to identify
Test Unit 2 (89–120 cm), Feature 2	1	*Quadrula apiculata*	umbo fragment
	2	unidentified	umbo fragments, too small/fragmentary to identify (FS #4)
Test Unit 2 (120–130 cm), Feature 2	1	*Quadrula petrina*	partial valve
	1	*Quincuncina mitchelli*	umbo fragment (FS #7)
	1	unidentified	umbo fragment, too weathered to identify
Test Unit 2 (130–157 cm), Feature 2	1	*Quadrula apiculata*	umbo fragment
	2	*Amblema plicata*	umbo fragments
	2	*Tritogonia verrucosa*	umbo fragment, partial valve
	7	unidentified	umbo fragments, too small/fragmentary to identify
Test Unit 2 (172–184 cm), Feature 4	1	unidentified	psuedocardinal tooth, too small to identify (FS #10)
Test Unit 1 (145–156 cm), Feature 1	1	unidentified	umbo fragments, too small/fragmentary to identify (FS #1)
Test Unit 1 (160–165 cm), Feature 1	3	unidentified	umbo fragments, too small/fragmentary to identify (FS #3)
Test Unit 2 (130–140 cm), Feature 2	1	*Amblema plicata*	partial valve (FS #8)
Subtotal	106		
41BL589B, ANALYSIS UNIT 1			
Test Unit 1 (10–20 cm)	1	*Amblema plicata*	umbo fragment
	3	unidentified	umbo fragments, too fragmentary to identify

Table D.4, continued

Provenience	No. of Specimens	Identification	Description
Test Unit 1 (20–30 cm)	2	*Quadrula apiculata*	umbo fragments
	4	*Quadrula* sp.	umbo fragments
	7	unidentified	umbo fragments, too fragmentary to identify
Subtotal	17		
Total	760		

APPENDIX E: Analysis of Macrobotanical Remains

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INTRODUCTION

This report presents results of the macrobotanical analysis of charred remains recovered from 40 flotation samples and 20 macroplant samples collected as individual charcoal samples during excavations (Table E.1). All of these samples were recovered from nine archeological sites on Fort Hood. Six of these sites are located in Bell County (41BL231-D, 41BL488-A, 41BL490, 41BL491, 41BL589-B, and 41BL991-B), and three are located in Coryell County (41CV580, 41CV686-A, and 41CV1434-B). Analysis of the archaeobotanical assemblage provides an inventory of plant materials from these sites and additional information about prehistoric land use in the region.

Table E.1. Summary of macroplant and flotation samples submitted for analysis

Site	Number of Macroplant Samples	Number of Flotation Samples	Total Volume of Flotation Samples (liters)
41BL231-D	–	4	9.25
41BL488-A	2	–	–
41BL490	–	1	1.00
41BL491	1	2	5.00
41BL589-B	1	1	3.75
41BL991-B	13	16	91.75
41CV580	3	11	64.00
41CV686	–	3	10.50
41CV1434-B	–	2	26.50
Totals	20	40	211.75

LABORATORY METHODS AND DEFINITION OF TAXONOMIC CATEGORIES

Macroplant samples are individual pieces of charred plant material that were collected as a discrete sample during archeological excavation. Most of the macroplant samples were found in situ and piece-plotted (i.e., their locations were mapped on a unit record or feature form), but some are charcoal fragments found during screening of cultural sediment. The piece-plotted samples have a precise elevation, but macroplant samples recovered from screens are associated with a 10-cm-thick excavation level. Flotation samples are archeological sediment that was floated in water to separate lighter charred plant remains from heavier materials or clays and silts that can be suspended in water and rinsed out of the sample. Personnel from Prewitt and Associates floated the sediment samples, and the light fraction (and any charred remains observed in the heavy fraction) were submitted to Texas A&M University for analysis. Most of the macroplant and flotation samples are associated with cultural features.

Standard archaeobotanical laboratory procedures were followed during analysis. The samples were first opened and dried in an herbarium dryer. Then each sample was sorted through a series of four nested geological screens with mesh sizes of 4 mm, 2 mm, 1 mm, and 0.45 mm. The material caught on all of the sieve levels, including the pan, was scanned for floral parts, fruits, and seeds. The carbonized macrobotanical samples that were submitted for identification were sorted and identified. All carbonized wood was identified using the snap technique, examining the samples at 8x to 45x magnifications with a hand lens or a binocular dissecting microscope and comparing them to samples in the herbarium at the Texas A&M University Archaeobotanical Laboratory. Charred seeds and fruit and nut fragments were counted. Identifications were made using reference collections at Texas A&M University. Carbonized wood was treated in the same manner.

The anatomy of some woods is so similar that small fragments are very difficult to identify to the genus level. In other cases, genera within a plant family are usually distinguishable, but some of the archeological material is often too fragmented or deteriorated to allow identification to the genus level. For these reasons, some taxa are combined into wood types. All identifications in the type category represent identifications to the family level indicated by the name of the type. The following wood types or categories are used in this report:

Willow Family Wood Type (Salicaceae):
Includes members of the Salicaceae family—willow and cottonwood—which are difficult to distinguish.

Rose Family Wood Type (Rosaceae):
Includes members of the Rosaceae family—hawthorns, wild plums, and wild peaches. Small fragments of these woods are usually difficult to distinguish.

Indeterminate Hardwood:
Refers to any woody seed-bearing tree—that is, not a cone-bearing tree such as pine, cypress, or juniper.

In addition to these wood types, all specimens identified as *Juniperus* sp. could actually be considered to be in the Cypress Family Wood Type. Trees in the plant family Cupressaceae include both junipers (*Juniperus* sp.) and bald cypress (*Taxodium distichum*), both of which are indistinguishable in cross section under low magnification. The materials from Fort Hood are most likely juniper, and all samples are identified as *Juniperus* sp. Two species of juniper are abundant throughout Fort Hood, but no cypress trees are found there (Sanchez 1997). It is possible, although unlikely, that some of the samples identified as *Juniperus* sp. might be *Taxodium distichum*.

Because there is poor preservation at most open sites, only carbonized plant remains are considered for inclusion in the archeological assemblage. Personnel at Prewitt and Associates scanned the heavy fraction of each sample, and carbonized plant material from each heavy fraction was submitted for identification along with the corresponding light fraction. Counts from the heavy fraction are combined with the light fraction in the tables that list identifications from each site.

RESULTS

The archaeobotanical assemblage, recovered from 40 flotation samples and 20 macroplant samples, consists of 17 wood types or taxa, and hickory nuts, pecan nuts, acorn fragments, cane stems, and seeds of grapes, grass, milkweed, persimmon, and wild plum. The flotation sample assemblage is composed predominantly of charred wood remains (n = 642 fragments) weighing 37.3 g. Also, there are 114 seed, acorn, and nut fragments along with 4 cane stem fragments noted in the samples. This material was recovered from samples measuring a total of 212 liters, for an average density of 0.53 acorns, seeds, or nuts per liter. Identifications of the macroplant samples are presented in Table E.2, and identifications of the charred plant remains recovered from flotation samples are in Table E.3.

41BL231-D

All of the flotation samples from this site were recovered from Feature 1. Unlike the other sites in the project area, juniper is the dominant wood type, followed by oak, elm, and hickory. Food resources noted in the samples are grass seed of the genus *Panicum*, which produces a fairly large (2 mm) and edible caryopsis or seed, and wild plum.

41BL488-A

Two macroplant samples were examined from this site. Wood charcoal samples from this small rockshelter are identified as oak and juniper.

41BL490

One flotation sample from this site contains oak and hackberry charcoal, hickory nut fragments, and common cane stem. This is the first report of common cane from a site in the Fort Hood region. It is a very important indigenous resource for both food and technology. Although the seeds of common cane are edible and were often collected and processed, only the stem fragments were recovered from this site. Hickory nuts were probably also processed at this rockshelter.

41BL491

Macroplant and flotation samples from 41BL491 yielded much more plant material, but most of it is oak and juniper wood charcoal. Twelve hickory nut fragments (0.4 g) were also recovered from the site, however, suggesting that hickory nut processing occurred in conjunction with the occupation(s) at this rockshelter.

41BL589-B

Two samples, one flotation and one macroplant, were examined from 41BL589-B. These

Table E.2. Charred plant remains recovered as macroplant samples

Site	Sample	Feature Association	Provenience	Taxon	Common Name	Plant Part	Weight (g)
41BL488-A	C-1*	none	Rockshelter 1, TU 1 (16 cm)	*Quercus* sp.	oak	wood	0.6
	C-3*	none	Rockshelter 2, TU 3 (10–20 cm)	*Juniperus* sp.	juniper	wood	0.2
41BL491	C-1*	none	TU 1 (20–30 cm)	*Juniperus* sp.	juniper	wood	0.5
41BL589-B	C-1*	1	TU 1 (26 cm)	*Quercus* sp.	oak	wood	0.3
41BL991-B	C-1	none	Backhoe Trench 15 (85–90 cm)	*Quercus* sp.	oak	wood	0.6
	C-2	none	TU 2 (80–85 cm)	*Quercus* sp.	oak	wood	0.4
	C-3	none	TU 2 (85–90 cm)	*Quercus* sp.	oak	wood	1.1
	C-4	1	TU 3 (96 cm)	indeterminate	–	wood	0.6
	C-7	none	TU 2 (88 cm)	*Juglans* sp.	walnut	wood	0.2
	C-8	1	TU 3 (95 cm)	*Quercus* sp.	oak	wood	5.3
	C-9	1	TU 3 (98 cm)	*Quercus* sp.	oak	wood	6.6
	C-10	1	TU 3 (104 cm)	*Quercus* sp.	oak	wood	4.3
	C-11	none	TU 2 (90–100 cm)	*Quercus* sp.	oak	wood	0.5
	C-12	1	TU 3 (100 cm)	*Quercus* sp.	oak	wood	1.8
	C-13	1	TU 3 (104 cm)	*Quercus* sp.	oak	wood	11.8
	C-14*	1	TU 3 (112 cm)	*Quercus* sp.	oak	wood	13.6
	C-16	1	TU 3 (90 cm)	Salicaceae	rose family	wood	1.1
41CV580	C-3*	none	TU 3 (40 cm)	*Celtis* sp.	hackberry	wood	0.3
	C-9*	3	TU 3 (98 cm)	indeterminate hardwood	–	wood	0.1
	C-15*	2	TU 2 (150 cm)	*Quercus* sp.	oak	wood	0.2
Total							50.1

Note: All samples were submitted for radiocarbon assay.

samples contain three hickory nut fragments and about 0.5 g of oak wood charcoal.

41BL991-B

The 16 flotation samples and 13 macroplant samples from this site contain nine wood taxa or types: oak, juniper, elm, hackberry, walnut, willow or cottonwood, rose family (cf. Hawthorn), sumac, and hickory. Of the 16 samples examined, all but 3 contain identifiable wood fragments, which total 218 and weigh 17.8 g. Thirteen hickory nut fragments weighing 0.4 g were recovered from four of the flotation samples. No other plant resources were noted. The hickory nut fragments may indicate that nut processing occurred at the site.

41CV580

Three macroplant samples and 11 flotation samples totaling 64 liters were processed from this site. The flotation samples came from Features 1, 2, 3, and 4 and from general contexts.

Oak, white oak, hackberry, maple or boxelder, and hickory wood were recovered from Feature 1. No evidence of edible plant parts was identified in the flotation samples.

Macroplant and flotation samples collected from Feature 2 contain eight woody taxa—oak, elm, persimmon, hackberry, hickory, redbud, rose family, and willow. This is a remarkable variety of wood taxa from a single feature and points to multiple use episodes or the deposition of trash from multiple sources. Both oak acorn fragments and milkweed seeds were recovered from Feature 2 as well. Because parching acorns is a common practice before making acorn flour, charred acorn fragments are expected at sites where acorns were processed. Milkweed seeds are edible and may indicate specific processing activities that occurred in the vicinity of the feature.

The flotation sample from Feature 3 contains seven oak acorns representing byproducts of acorn processing. The most abundant wood type is oak, which occurred with soapberry, hickory, and hackberry. One macroplant sample consists of an indeterminate hardwood.

Feature 4 produced very few plant remains. Only 0.1 gram of oak wood was recovered from the two flotation samples.

One macroplant sample collected from a nonfeature context at 41CV580 consists of hackberry wood. Also, two of three flotation samples recovered from general level matrix contain willow and oak wood. The third sample was slightly more diverse and yielded wood of black locust, rose family, and oak, along with two grape seeds.

Plant remains from 41CV580 indicate that the site was used as an acorn-processing site. Grape and milkweed were noted in the samples as well. Grapes ripen in early summer to midsummer, and milkweed, usually in midsummer. Acorns ripen in the fall but can be parched and stored in the shell and consumed throughout the winter.

41CV686-A

Three flotation samples, all from Feature 1, were processed. The samples contain eight wood types, oak acorns, pecan nut fragments, and persimmon seeds. Although the samples contained several wood types, oak wood charcoal dominates the counts. Food resources noted in the samples are acorn, persimmon, and pecan. The samples from this feature are notable in that they contain a total of 51 acorn fragments weighing 0.8 g, more than any others in the project. Because the quantity of acorn fragments recovered from 41CV686-A is unusually high, the site was probably used to process this resource in large quantities.

41CV1434-B

Two flotation samples were processed from 41CV1434-B, but they contained very few plant remains. These samples contained a few fragments of maple, oak, and willow charcoal. No remains of edible plant resources were found at 41CV1434-B.

ETHNOBOTANICAL OVERVIEW AND DISCUSSION

Macroplant and flotation samples from 12 sites on Fort Hood yielded a wide variety of different plants used as fuel, food, or other purposes. The identified charred plant remains are summarized in Table E-4. Several plant taxa recovered in the samples have ethnographically documented uses other than fuel. The following overview provides a brief discussion of the utility of these plants. An understanding of plant use

Table E.3. Charred plant remains recovered from flotation samples

Feature Association	Sample No.	Analysis Unit	Provenience	Sample Volume (liters)	Taxon	Common Name	Plant Part	Wood Count	Wood Weight (grams)	Nonwood Count*	Nonwood Weight (grams)
41BL231-D											
Feature 1	F-1	--	TU 2, 30-40 cm	6.39	*Juniperus* sp.	Juniper	Wood	12	0.2	--	--
					Quercus sp.	Oak	Wood	3	0.2	--	--
					Ulmus sp.	Elm	Wood	4	0.2	--	--
					Prunus sp.	Plum	Seed	--	--	1	0.1
Feature 1	F-2	--	TU 3, 30-40 cm	7.10	*Juniperus* sp.	Juniper	Wood	12	0.2	--	--
					Quercus sp.	Oak	Wood	14	0.3	--	--
Feature 1	F-3	--	TU 3, 40-50 cm	6.39	*Juniperus* sp.	Juniper	Wood	20	0.3	--	--
					Quercus sp.	Oak	Wood	12	0.4	--	--
					Panicum sp.	Panic Grass	Seed	--	--	3	0.1
					Carya sp.	Hickory	Wood	3	0.2	--	--
Feature 1	F-4	--	TU 2, 40-50 cm	6.39	*Juniperus* sp.	Juniper	Wood	3	0.1	--	--
Subtotals				26.27				83	2.1	4	0.2
41BL490											
Nonfeature	F-1	--	TU 2, 10-19 cm	2.84	*Quercus* sp.	Oak	Wood	8	0.1	--	--
					Celtis sp.	Hackberry	Wood	7	0.3	--	--
					Carya sp.	Hickory	Nut	--	--	9	0.2
					Phragmites communis	Cane	Stem	--	0.1	4	--
Subtotals				2.84				15	0.5	13	0.2
41BL491											
Nonfeature	F-1	--	TU 1, 30-40 cm	11.36	*Carya* sp.	Hickory	Nut	--	--	8	0.3
					Quercus sp.	Oak	Wood	25	0.5	--	--
Nonfeature	F-2	--	TU 1, 40-45 cm	2.84	*Carya* sp.	Hickory	Nut	--	--	4	0.1
					Juniperus sp.	Juniper	Wood	12	0.5	--	--
					Quercus sp.	Oak	Wood	13	0.6	--	--
Subtotals				14.20				50	1.6	12	0.4
41BL589-B											
Feature 1	F-1	--	TU 1, 19-28 cm	10.65	*Quercus* sp.	Oak	Wood	5	0.2	--	--
					Carya sp.	Hickory	Nut	--	--	3	0.1
Subtotals				10.65				5	0.2	3	0.1
41BL991-B											
Nonfeature	F-1	2	TU 2, 80-90 cm	6.39	*Quercus* sp.	Oak	Wood	7	0.1	--	--
Nonfeature	F-2	2	TU 5, 90-100 cm	12.78	*Quercus* sp.	Oak	Wood	12	0.2	--	--
Feature 1	F-3	2	TU 3, 80-90 cm	12.78	*Quercus* sp.	Oak	Wood	10	0.3	--	--
					Salicaceae	Willow Family Wood Type	Wood	15	0.1	--	--

Table E.3, continued

Feature Association	Sample No.	Analysis Unit	Provenience	Sample Volume (liters)	Taxon	Common Name	Plant Part	Wood Count	Wood Weight (grams)	Nonwood Count*	Nonwood Weight (grams)
Feature 2	F-4**	2	TU 4, 45-70 cm	56.78	Chacoal flecks, no identification			--	--	--	--
Feature 2	F-5	2	TU 4, 52-62 cm	35.49	*Carya* sp.	Hickory	Wood	5	0.2	--	--
Feature 3	F-6**	2	TU 6, 120-135 cm	10.65	Chacoal flecks, no identification			--	--	--	--
Nonfeature	F-7	2	TU 2, 75-90 cm (from burned rock cluster near Feature 4)	10.65	*Quercus* sp.	Oak	Wood	10	0.3	--	--
Feature 4	F-8**	2	TU 2, 75-93 cm	22.00	*Quercus* sp.	Oak	Wood	4	0.2	--	--
					Ulmus sp.	Elm	Wood	6	0.3	--	--
Feature 1	F-9	2	TU 3 (north half), 92-102 cm (top rock layer)	17.75	*Quercus* sp.	Oak	Wood	7	0.3	--	--
					Ulmus sp.	Elm	Wood	8	0.2	--	--
					Rosaceae	Rose Family Wood Type	Wood	6	0.2	--	--
					Salicaceae	Willow Family Wood Type	Wood	4	0.2	--	--
					Carya sp.	Hickory	Nut	--	--	3	0.1
Feature 1	F-10	2	TU 3 (north half), 97-110 cm (second rock layer)	15.62	*Quercus* sp.	Oak	Wood	10	2.3	--	--
					Ulmus sp.	Elm	Wood	7	1.8	--	--
					Rhus sp.	Sumac	Wood	6	0.3	--	--
					Salicaceae	Willow Family Wood Type	Wood	2	0.1	--	--
					Carya sp.	Hickory	Nut	--	--	4	0.1
Feature 1	F-11	2	TU 3 (north half), 106-112 (third rock layer)	12.78	*Quercus* sp.	Oak	Wood	8	0.5	--	--
Feature 1	F-12	2	TU 3 (south half), 82-91 cm	6.39	*Quercus* sp.	Oak	Wood	8	0.5	--	--
					Carya sp.	Hickory	Wood	7	0.1	--	--
					Ulmus sp.	Elm	Wood	6	0.2	--	--
					Salicaceae	Willow Family Wood Type	Wood	4	0.1	--	--
Feature 1	F-13	2	TU 3 (south half), 82-102 cm	25.55	*Quercus* sp.	Oak	Wood	8	0.3	--	--
					Indeterminate Hardwood	Indeterminate Hardwood	Wood	3	0.1	--	--
Nonfeature	F-14	2	TU 3, 85-95 cm	6.39	Chacoal flecks, no identification			--	--	--	--
Nonfeature	F-15**	2	TU 3, 87-95 cm	0.71	*Quercus* sp.	Oak	Wood	12	2.7	--	--
					Celtis sp.	Hackberry	Wood	9	1.4	--	--

Table E.3, continued

Feature Association	Sample No.	Analysis Unit	Provenience	Sample Volume (liters)	Taxon	Common Name	Plant Part	Wood Count	Wood Weight (grams)	Nonwood Count*	Nonwood Weight (grams)
					Salicaceae	Willow Family Wood Type	Wood	7	0.4	--	--
					Indeterminate Hardwood	Indeterminate Hardwood	Wood	2	0.1	--	--
					Carya sp.	Hickory	Nut	--	--	4	0.1
Feature 1	F-16	2	TU 3, 100-110 cm	18.45	*Quercus* sp.	Oak	Wood	8	2.2	--	--
					Celtis sp.	Hackberry	Wood	5	1.4	--	--
					Salicaceae	Willow Family Wood Type	Wood	5	0.4	--	--
					Rosaceae	Rose Family Wood Type	Wood	3	0.1	--	--
					Juniperus sp.	Juniper	Wood	2	0.1	--	--
					Indeterminate Hardwood	Indeterminate Hardwood	Wood	2	0.1	--	--
					Carya sp.	Hickory	Nut	--	--	2	0.1
Subtotals				239.21				174	17.1	13	0.4
41CV580											
Feature 1	F-1	5	TU 1, 145-156 cm	33.36	*Quercus* sp.	Oak	Wood	12	0.4	--	--
					Celtis sp.	Hackberry	Wood	4	0.2	--	--
					Acer sp.	Maple/Boxelder	Wood	3	0.2	--	--
					Carya sp.	Hickory	Wood	4	0.2	--	--
Feature 1	F-3	5	TU 1, 160-165 cm	24.84	*Quercus* sp.	White Oak	Wood	4	0.1	--	--
Feature 2	F-4	5	TU 2, 89-120 cm	42.59	*Ulmus* sp.	Elm	Wood	5	0.1	--	--
Feature 2	F-7	5	TU 2, 120-130 cm	14.91	Rosaceae	Rose Family	Wood	8	0.6	--	--
					Salicaceae Type	Willow Family	Wood	10	0.3	--	--
					Diospyros sp.	Persimmon	Wood	7	0.6	--	--
Feature 2	F-8	5	TU 2, 130-140 cm	14.91	*Quercus* sp.	Oak	Wood	4	0.3	--	--
					Carya sp.	Hickory	Wood	6	0.2	--	--
					Quercus sp.	Oak	Acorn	--	--	5	0.2
					Salicaceae Type	Willow Family	Wood	6	0.3	--	--
					Celtis sp.	Hackberry	Wood	7	0.4	--	--
					Cercis canadensis var. *texensis*	Texas Redbud	Wood	2	0.3	--	--
					Asclepias sp.	Milkweed	Seed	--	--	3	0.1
Feature 3	F-6	3	TU 3, 88-103 cm	15.62	*Quercus* sp.	Oak	Acorn	--	--	7	0.1
					Sapindus saponaria	Soapberry	Wood	6	0.4	--	--
					Celtis sp.	Hackberry	Wood	7	0.4	--	--
					Carya sp.	Hickory	Wood	4	0.2	--	--
					Quercus sp.	Oak	Wood	10	0.6	--	--

Table E.3, continued

Feature Association	Sample No.	Analysis Unit	Provenience	Sample Volume (liters)	Taxon	Common Name	Plant Part	Wood Count	Wood Weight (grams)	Nonwood Count*	Nonwood Weight (grams)
Feature 4	F-9	5	TU 2, 173-181 cm	2.13	*Quercus* sp.	Oak	Wood	4	0.1	--	--
Feature 4	F-10	5	TU 2, 172-184 cm	9.23	No Carbonized Plant Remains	--	--	--	--	--	--
Nonfeature	F-2	2	TU 3, 40-50 cm	5.68	*Quercus* sp.	Oak	Wood	14	0.6	--	--
					Robinia pseudoacacia	Black Locust	Wood	7	0.2	--	--
					Rosaceae	Rose Family	Wood	4	0.1	--	--
					Vitis sp.	Grape	Seed	--	--	2	0.1
Nonfeature	F-5	3	TU 3, 90-100 cm	6.39	*Quercus* sp.	Oak	Wood	17	0.1	--	--
					Salicaceae Type	Willow Family	Wood	8	0.4	--	--
Nonfeature	F-11	5	TU 3, 250-260 cm	12.07	*Quercus* sp.	Oak	Wood	4	0.1	--	--
					Salicaceae Type	Willow Family	Wood	4	0.1	--	--
Subtotals				181.73				171	7.5	17	0.5
41CV686-A											
Feature 1	F-1	--	TU 1,30-40 cm	12.78	*Quercus* sp.	Oak	Wood	22	1.3	--	--
					Quercus sp.	Oak	Acorn	--	--	23	0.4
					Celtis sp.	Hackberry	Wood	3	0.4	--	--
Feature 1	F-2	--	TU 1, 40-50 cm	11.36	*Ulmus* sp.	Elm	Wood	3	0.3	--	--
					Quercus sp.	Oak	Wood	17	3.2	--	--
					Quercus sp.	Oak	Acorn	--	--	21	0.3
					Carya illinoiensis	Pecan	Nut	--	--	3	0.2
					Diosypros sp.	Persimmon	Wood	5	0.3	--	--
Feature 1	F-3	--	TU 1, 50-57 cm	2.84	*Quercus* sp.	Oak	Wood	14	0.2	--	--
					Platanus sp.	Sycamore	Wood	2	0.3	--	--
					Carya sp.	Hickory	Wood	3	0.2	--	--
					Salicaceae Type	Willow Family	Wood	6	0.4	--	--
					Diospyros sp.	Persimmon	Seed	--	--	2	0.2
					Quercus sp.	Oak	Acorn	--	--	7	0.1
Subtotals				26.98				75	6.6	56	1.2
41CV1434-B											
Feature 2	F-1	--	TU 1, 30-41 cm	24.84	No Carbonized Plant Remains	--	--	--	--	--	--
Feature 2	F-2	--	TU 1, 11-53 cm	50.40	*Acer* sp.	Maple/Boxelder	Wood	12	0.5	--	--
					Quercus sp.	Oak	Wood	7	0.3	--	--
					Salicaceae Type	Willow Family	Wood	6	0.2	--	--
Subtotals				75.24				25	1.0	0	0.0
Totals				609.07				642	37.3	118	3.0

* Nonwood includes acorns, nuts, seeds, and stem fragments.

** Small fragments of charred wood were removed and submitted for AMS radiocarbon assay.

Table E.4. Summary of charred plant remains recovered from all sites

Taxon	Common name	Plant Part	41BL231-D	41BL488-A	41BL490	41BL491	41BL991-B	41BL589-B	41CV580	41CV686-A	41CV1434-B
Acer sp.	maple/boxelder	wood							X		X
Asclepias sp.	milkweed	seed							X		
Carya illinoiensis	pecan	nut								X	
Carya sp.	hickory	nut			X	X		X			
Carya sp.	hickory	wood	X						X	X	
Celtis sp.	hackberry	wood			X				X	X	
Cercis canadensis var. *texensis*	Texas redbud	wood							X		
Diospyros sp.	persimmon	seed								X	
Diospyros sp.	persimmon	wood							X	X	
indeterminate hardwood	–	wood							X		
Juglans sp.	walnut	wood					X				
Juniperus sp.	juniper	wood	X	X		X					
Panicum sp.	panic grass	seed	X								
Phragmites communis	cane	stem			X						
Platanus sp.	sycamore	wood								X	
Prunus sp.	plum	seed	X								
Quercus sp.	oak	acorn							X	X	
Quercus sp.	oak	wood	X	X	X	X		X	X	X	X
Quercus sp.	white oak	wood							X		
Robinia pseudoacacia	black locust	wood							X		
Rosaceae type	rose family	wood							X		
Salicaceae type	willow family	wood							X	X	X
Sapindus saponaria	soapberry	wood							X		
Ulmus sp.	elm	wood	X						X	X	
Vitis sp.	grape	seed							X		
Total wood types/species represented (includes cane)			4	2	3	2	1	1	13	7	3
Total acorn/nut/seed species represented			2	0	1	1	0	1	3	3	0

illuminates the nature of prehistoric land use in the Fort Hood region.

Oak and Acorns

The importance of acorns in the diet of foragers in North America is often encountered in the archeological literature. Acorns are processed by several different methods that involve removing unpalatable tannins and grinding or pounding the endosperm into flour. The oak wood and acorn fragments from the Fort Hood sites indicate that the resource was used for food as well as fuel. The extensive ethnographic descriptions of acorn use originate primarily from western North America, especially California, where the importance of acorns in the diet is undisputed. Yet hard evidence for acorn use in the archeological record of California is almost always limited to the presence of ground stone implements and bedrock features (Jackson 1991). This unfortunate lack of evidence may be a consequence of the processing steps necessary for removing tannins, such as soaking the acorns in water or burying them in mud. Thus, oak processing often may not have encouraged accidental charring of acorns (see Gifford [1936] for a description of acorn processing). To complicate matters, tools or features used for acorn flour processing such as mortars and pestles, grinding stones, or nutting stones may also be used to process many other plants. Still, the presence of any acorn fragments in the features at sites in central Texas may suggest that acorns were processed at the sites, and the unusually high density of acorn fragments at 41CV686-A may be a clear indication of acorn processing.

Linking the presence of charred acorns to the function of specific features, especially large fire-cracked rock features, is difficult. Parching in coals or on heated rocks most likely would result in accidental charring of acorns. The ethnographic literature is not very helpful or reliable in determining what specific kinds of archeological features or artifacts were associated with parching. Most ethnographic accounts of parching describe trays woven of perishable materials such as willow withes or plant fibers or involve open heating features, not earth-covered ovens (Gifford 1936). Neither of these processes is easily detectable in the archeological record. On the other hand, there is a singular record of charred acorns recovered from a pit filled with fire-cracked rocks at 41BN100 in Bandera County ca. 175 km southwest of Fort Hood (Dering, personal observation). Although determining the importance of acorns to the aboriginal diet in central Texas will require arguments that use multiple lines of evidence, the findings at 41CV686-A certainly provide further evidence of acorn use by the prehistoric foragers of central Texas.

Milkweed

Although it is a versatile food resource widely cited in the ethnobotanical literature of North America, milkweed is not often recovered from archeological sites. This may be because the seeds, the most survivable part of the plant, are actually the least mentioned in the literature. The flowers, green fruits, and roots are much more often declared useful or edible than the seeds (Densmore 1928; Gilmore 1919; Parker 1910; Saunders 1920). The substantial taproot of the milkweed was used by several groups in the Great Plains (Palmer 1871).

***Panicum* sp.**

The genus *Panicum* is composed of more than 50 species of grasses distributed throughout North America. Its fruit or seed is rather large, and many species are edible. Vine-mesquite (*Panicum obtusum*) is a species that grows throughout central and western Texas and the arid southwest and is mentioned specifically in Hough's (1897) ethnobotany of the Hopi. As with most grasses, the seeds were parched and ground into flour.

Common Cane

Every major part of common cane, *Phragmites communis,* was useful to the indigenes of North America. The woody stem was used for basketry and weapons, especially arrow shafts. The young roots and rhizomes were pounded into mush for their sugar content, and the seeds were ground into flour (Chamberlain 1911; Cushing 1920). Although robust canes such as *Arundinaria gigantea* have been identified at open Caddoan sites in eastern Texas (Dering 1999), common cane is seldom noted outside of the well-preserved rockshelter deposits in the lower Pecos River region.

Fruit Trees and Vines

Use of fruit trees and vines is, of course widely documented in the ethnobotanical record (e.g. Sturtevant 1919), but the occurrence of fruit seeds or pits is relatively rare at open sites in central Texas. Persimmon, grape, and wild plum are present in the samples from 41CV686-A, 41CV580, and 41BL231-D.

SUMMARY

Analysis of flotation and macroplant samples indicates that at least two sites in this study were used to process both acorns and hickory nuts in bulk. Although the evidence for processing acorns is particularly abundant at 41CV686-A, 41CV580 was also used for acorn processing. Hickory nuts were noted at 41CV686-A, and 41BL589-B, 41BL490, and 41BL491. Other plant resources were less widespread and included grass seed (*Panicum* sp.), persimmon, wild plum, and milkweed seed. As evidence for acorn processing accumulates, perhaps further consideration should be given to the seasonal importance of this plant resource.

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